Int.J.Curr.Microbiol.App.Sci (2017) *6*(6): 2017-2025

International Journal of Current Microbiology and Applied Sciences
ISSN: 2319-7706 **Volume 6 Number 6 (2017) pp. 2017-2025**
Journal homepage: http://www.ijcmas.com

Original Research Article https://doi.org/10.20546/ijcmas.2017.606.237

Influence of Plant Growth Regulators on Growth, Root Tuber Yield and Quality of Orange Flesh Sweet Potato (*Ipomoea batatas* (L.) Lam.) Varieties

G. Koteswara Rao*, P. Ashok, D.V. Swami and K. Sasikala

Department of Vegetable Science, Horticultural College and Research Institute, Dr. Y.S.R. Horticultural University, Venkataramannagudem- 534101, Andhra Pradesh, India
**Corresponding author*

Keywords

Orange flesh sweet potato, Plant growth regulators, Quality characters, Varieties, Vegetative characters and Yield

Article Info

Accepted:
23 May 2017
Available Online:
10 June 2017

A B S T R A C T

A field experiment was carried out during *kharif* 2015-16 at Horticultural College and Research Institute, Dr. Y.S.R. Horticultural University, Venkataramannagudem (A.P) to study the performance of orange flesh sweet potato varieties to plant growth regulators for vegetative, flower, root tuber yield and quality characters. The results revealed that the spraying of GA_3 @ 300 ppm showed maximum length of leaf lobe and leaf area in the variety ST-14. Flower characters like maximum number of flowers per plant and seed set percentage were recorded in the variety Kamala sundari by the application of 2, 4-D @ 15 ppm, while maximum number of seeds per capsule was recorded in the variety Kamala sundari by the application of GA_3 @ 300 ppm. The maximum root tuber yield was recorded in the combination of V_1C_2 (ST-14 + GA_3 @ 300 ppm) and highest total sugars was recorded in the combination of V_2C_2 (Kamala sundari + GA_3 @ 300 ppm).

Introduction

Sweet potato (*Ipomoea batatas* (L.) Lam.) Is an important starchy food crop grown throughout the tropical and sub-tropical parts of the world? It is an herbaceous, perennial vine cultivated as an annual belongs to family Convolvulaceae. It is originated from Central America. In India, sweet potato is being cultivated in almost all the states with an area of 111 ha, with a production of 1450 metric tonnes and productivity of 10.4 MT ha^{-1} (NHB, 2015). India accounts for about 68% of the total production of South Asia followed by 27% in Bangladesh and about 5% in Sri Lanka. In India, Sweet potato is cultivated mainly in Odisha, Uttar Pradesh, West Bengal, Bihar, Karnataka, Andhra Pradesh, Tamil Nadu and Kerala.

The application of plant growth regulators has positive effect in sweet potato. Foliar application of growth regulators is reported to improve growth, early flowering, increased flowering and tuber yield. Growth regulators are also reported to improve yield of many

horticultural crops those in which the underground part is economically important. As sweet potato is clonally propagated crop, crop improvement is possible through clonal hybridization. For this, the desired genotypes for crossing should have more number of flowers, often this is not so. Growth regulators which influence the flower development and seed set need to be tested. Therefore, the present study was under taken to study the varietal response of orange flesh sweet potato varieties to different plant growth regulators for vegetative, root tuber yield and quality characters and to determine optimum concentration of plant growth regulators for improving the flower characters.

Materials and Methods

The experiment was laid out in Randomized block design with factorial concept and replicated thrice. The experiment consisted of two factors *viz*., varieties (ST-14, Kamala sundari and Kiran) and different PGR concentrations (GA_3 @ 200 and 300 ppm, CCC @ 300 and 500 ppm, 2, 4-D @ 10 and15 ppm and Control. The planting material was collected from AICRP on tuber crops project, HRS, Venkataramannagudem. Vine cuttings of 25-30 cm length were planted at a spacing of 60 X 20 cm. The prepared plant growth regulator solutions were sprayed with baby sprayer for uniform coverage. In each treatment, the plants were sprayed twice at 30 and 60 days after transplanting. The data on vegetative growth, flower and root tuber characters were recorded and analysed statistically by using OPSTAT software.

Results and Discussion

Vegetative attributes

The data on vegetative attributes as influenced by plant growth regulators and varieties was presented in table 1.

Length of leaf lobe

The length of leaf lobe was significantly influenced by different varieties at harvest. Maximum length of leaf lobe (12.81 cm) was recorded with ST-14 (V_1) at harvest, followed by Kamala sundari (V_2), and also length of leaf lobe was significantly influenced with different levels of plant growth regulators at harvest. Maximum length of leaf lobe (12.72 cm) was recorded with GA_3 @ 300 ppm (C_2), whereas the minimum length of leaf lobe (11.44 cm) was recorded with control (C_7). These results were in conformity with the findings of Mahabir Singh *et al.*, (1989) in radish, Sengupta *et al.*, (2008) in ginger and Patel *et al.*, (2010b) in onion. They reported that leaf width and leaf length were improved by the application of GA_3.

Leaf area (cm^2)

Maximum leaf area (92.46 cm^2) was recorded with ST-14 (V_1) at harvest, followed by Kamala sundari (V_2) (87.23 cm^2). Maximum leaf area (88.86 cm^2) was recorded with GA_3 @ 300 ppm (C_2), followed by GA_3 @ 200 ppm (C_1) (88.04 cm^2), whereas the minimum leaf area (86.66 cm^2) was recorded in control (C_7). The promotion of growth either in terms of increase the leaf area due to GA_3 has been thought to be by increasing plasticity of the cell wall followed by hydrolysis of starch to sugars which lowers the water potential of cell, resulting in the entry of water into the cell causing elongation. These osmotic driven responses under the influence of gibberellins might have attributed to increase in photosynthetic activity, accelerated translocation and efficiency of utilizing photosynthetic products, thus resulting in increased cell elongation and rapid cell division in the growing portion (Sargent, 1965). These results are in conformity with the findings of Singh and Choudhary (1989) in watermelon

Vine inter nodal length (cm)

Significantly maximum vine inter nodal length was recorded in the combination of ST-14 + GA_3 @ 300 ppm (V_1C_2) compared to ST-14 + Control (V_1C_7) (Plate I).

Application of GA_3 played an important role in enhancing the mean length of internode on main vine due to cell elongation and cell division. Similar results were observed by Brumbaugh (2008) in pea and Avinash *et al.*, (2011) in okra.

Number of branches per plant

Highest number of branches per plant (21.08) was recorded in the treatment combination of ST-14 + GA_3 @ 300 ppm (V_1C_2) compared to ST-14 + Control (V_1C_7) (Plate II).

The application of GA_3 enhances the lateral buds and vegetative growth which inturn increases the number of branches per plant. The results are in conformity with the findings of Mahesh and Sen (2005) in okra.

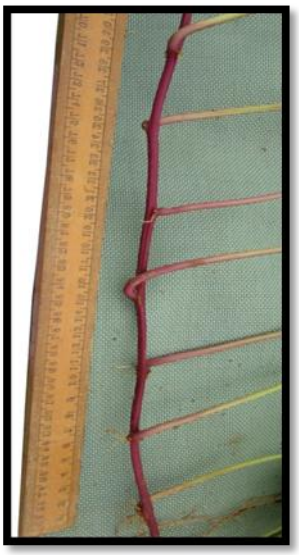
Flower attributes

The data on flower attributes as influenced by plant growth regulators and varieties was presented in table 1.

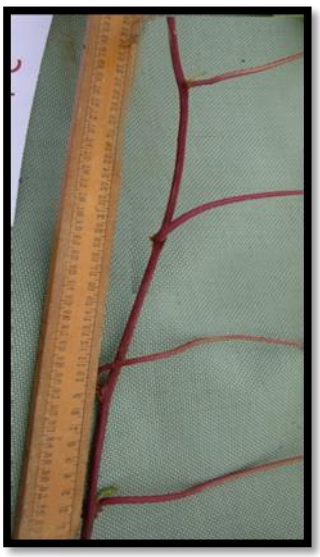
Total number of flowers per plant

The data on total number of flowers per plant was recorded from days taken to first flower initiation to till to the harvest. The maximum total number of flowers per plant (606.08) was recorded in Kamala sundari (V_2), followed by ST-14 (V_1) (567.19), whereas the minimum total number of flowers per plant (506.86) was recorded in Kiran (V_3). With respect to different levels of plant growth regulators, the highest total number of flowers per plant (620.12) was recorded in 2,4-D @ 15 ppm (C_6), followed by 2,4-D @ 10 ppm (C_5) (598.76). Significantly maximum number of flowers per plant (656.54) was recorded in the combination of Kamala Sundari + 2,4-D @ 15 ppm(V_2C_6) compared to Kamala Sundari + Control (V_2C_7) (Plate III).

Plate.1 Performance of GA_3 @ 300 ppm over the control on Vine inter nodal length of variety ST-14



ST-14 + Control (V_1C_7)



ST-14 + GA_3 @ 300 ppm (V_1C_2)

Plate.2 Performance of GA_3 @ 300 ppm over the control on Number of branches per plant of variety ST-14

ST-14 + Control (V_1C_7)

ST-14 + GA_3 @ 300 ppm (V_1C_2)

Plate.3 Performance of 2, 4-D @ 15 ppm over the control on total Number of flowers per plant of variety Kamala sundari

Kamala sundari + Control (V_2C_7)

Kamala sundari + 2,4-D @ 15 ppm (V_2C_6)

Table.1 Effect of plant growth regulators on orange flesh sweet potato (*Ipomoea batatas.* (L.). Lam) varieties for vegetative and flower characters at harvest

	Length of leaf lobe (cm)	Leaf area (cm^2)	Total number of flowers per plant	Length of the stamen (cm)	Length of the style (cm)	Seed set (%)	Number of seeds per capsule
Varieties							
ST-14 (V_1)	12.81	92.46	567.19	1.64	1.86	47.92	2.51
Kamala sundari (V_2)	12.57	87.23	606.08	1.74	1.68	65.86	2.89
Kiran (V_3)	11.06	82.90	506.86	1.63	1.90	38.78	2.73
SEm±	0.07	0.04	4.74	0.02	0.02	0.10	0.04
CD at 5%	0.22	0.13	13.56	0.06	0.06	0.29	0.12
PGRs'							
C_1 (GA_3- 200 ppm)	12.50	88.04	541.92	1.63	1.84	48.08	2.31
C_2 (GA_3- 300 ppm)	12.72	88.86	568.47	1.69	1.88	51.83	3.67
C_3 (CCC-300 ppm)	11.73	87.18	536.38	1.65	1.77	45.64	2.40
C_4 (CCC-500 ppm)	12.01	86.94	544.48	1.70	1.82	49.93	2.72
C_5 (2,4-D-10 ppm)	11.98	87.12	598.76	1.68	1.78	55.73	2.71
C_6 (2,4-D-15 ppm)	12.64	87.89	620.12	1.73	1.82	61.99	3.28
C_7 (Control)	11.44	86.66	518.31	1.62	1.77	42.77	1.86
SEm±	0.11	0.07	7.24	0.03	0.03	0.16	0.06
CD at 5%	0.33	0.20	20.71	NS	NS	0.45	0.18

Table.2 Effect of plant growth regulators on orange flesh sweet potato (*Ipomoea batatas.* (L.). Lam) varieties for root tuber yield and total sugars

	Root tuber yield (t ha^{-1})			**Total sugars (%)**		
Varieties / PGRs'	**ST-14 (V_1)**	**Kamala sundari (V_2)**	**Kiran (V_3)**	**ST-14 (V_1)**	**Kamala sundari (V_2)**	**Kiran (V_3)**
C_1 (GA_3 @ 200 ppm)	20.34	17.52	18.10	6.53	7.26	6.93
C_2 (GA_3 @ 300 ppm)	23.90	20.24	20.04	6.88	7.74	7.30
C_3 (CCC @ 300 ppm)	21.08	15.96	16.15	6.32	7.44	6.66
C_4 (CCC @ 500 ppm)	22.01	17.00	17.25	6.44	7.47	6.77
C_5 (2,4 D @ 10 ppm)	19.87	16.44	16.14	6.12	6.94	6.43
C_6 (2,4 D @ 15 ppm)	20.28	16.96	16.96	6.30	6.96	6.61
C_7 (Control)	19.54	13.26	15.10	5.13	6.88	6.35
	SEm±	**CD at 5%**		**SEm±**	**CD at 5%**	
Varieties	0.18	0.52		0.04	0.12	
PGR	0.28	0.80		0.06	0.18	
Interaction effect	0.48	1.38		0.11	0.32	

At low concentration, 2, 4-D stimulates flowering. This was in conformity with the findings of (Grossmann, 2007). It readily penetrate leaves, roots and stems and is rapidly transported via symplastic and apoplastic pathways (Chinalia *et al.,* 2007) and stimulate excessive biosynthesis of ethylene and abscisic acid. Increase in endogenous ethylene and abscisic acid results in floral organs development and flowering (Tan and Swain, 2006). Similar results of increase in number of flowers by application of 2,4-D were recorded by Ricard *et al.,* (1990), Shalaby *et al.,* (1994) and Walter *et al.,* (2013) in sweet potato, Anwar *et al.,* (2010) in tomato and Thomson *et al.,*(2015b) in pea.

Length of the stamen (cm) and style (cm)

The length of the stamen and style were found to be significantly influenced by different varieties. The maximum length of the stamen (1.74 cm) was recorded with Kamala sundari. The variety Kiran recorded significantly maximum length of style (1.90 cm). The effect of PGRs' on length of the stamen and style was found to be non-significant.

Seed set (%)

The data on the seed set percentage was significantly influenced with different varieties and plant growth regulators. Maximum seed set percentage (65.86%) was recorded in Kamala sundari followed by ST-14. With respect to different levels of plant growth regulators, the highest seed set percentage (61.99%) was recorded with the application of 2, 4-D @ 15 ppm than control. The growth substance, 2, 4-D is recognised as a growth promoter which induces more number of flowers, results into conversion of more flowers into capsules. Similar response of 2,4-D were earlier reported by Ricard *et al.,* (1990), Shalaby *et al.,* (1994) and Walter *et al.,*(2013) in sweet potato.

Number of seeds per capsule

Significantly maximum number of seeds per capsule (2.89) was recorded in Kamala sundari followed by Kiran. Among different plant growth regulators, maximum number of seeds per capsule (3.67) was recorded with the application of GA_3 @ 300 ppm than control. The increased number of seeds per capsule due to improved vegetative growth due to GA_3 application coupled with increased photosynthesis on one hand and greater mobilization of photosynthates towards reproductive sites, on the another hand, might have been found to increase the yield attributes in crop plants. Similar trends were also observed by Ricard *et al.,* (1990) in sweet potato, Jaymala singh *et al.,* (2012) in okra, Natesh *et al.,* (2005) and Dheer singh *et al.,* (2012) in coriander.

Root tuber yield and quality characters

Root tuber yield (t ha^{-1})

With respect to interactions, the maximum root tuber yield (23.90 t ha^{-1}) was recorded in the treatment combination of ST-14 + GA_3 @ 300 ppm (V_1C_2), whereas the minimum root tuber yield (13.26 t ha^{-1}) was recorded in the treatment combination of Kamala sundari + Control (V_2C_7) (Table 2). The plant growth regulator GA_3 is an important component to enhance cell multiplication and quick cell division which resulted in increasing the morphological characters of plants that ultimately increased the yield. The increase in vegetative characters may be due to cell division and quick cell multiplication, while the high yield may be attributed to better carbon assimilation and better carbon accumulation of carbohydrates in the plants. Similar results were also recorded by Baijal *et al.,* (1983) and Banerjee and Das (1984) in potato, Maurya and Lal (1987) in carrot, Vijay Kumar and Ray (2000) in cauliflower,

Verma (2000) in coriander, Padmavathi (1998) in onion, Remison *et al.,* (2002), Seema sarkar (2008) and El-Tohamy *et al.,* (2015) in sweet potato, Sengupta *et al.,* (2008), Thondaiman Velayutham and Parthiban (2013) in ginger, Tirakannawar *et al.,* (2009) in capsicum, Uddain *et al.,* (2009) and Ranjeet *et al.,* (2014) in tomato, Patel *et al.,* (2010a) in onion, Sawant *et al.,* (2010), Kotecha *et al.,* (2010) and Roy *et al.,* (2011) in cabbage and Bhagure and Tambe (2015) in okra.

Total sugars

Significantly maximum total sugars (7.74%) were recorded with the treatment combination of Kamala sundari + GA_3 @ 300 ppm (V_2C_2) (Table 2), whereas the minimum total sugars (5.13%) was recorded in the treatment combination of ST-14 + Control (V_1C_7). The increase in content of total sugars might be due to the quick transformation of starch into soluble solids and rapid mobilization of photosynthetic metabolites and minerals from other parts of the plant to developing parts (Singha, 2004). Similar trends were observed by Seema sarkar (2008) in sweet potato.

Based on the results obtained, it can be concluded that, ST-14 was found to be superior for vegetative characters and yield, while Kamala sundari is superior for flower characters. Among PGR concentrations, GA_3 @ 300 ppm has improved the vegetative and yield, whereas flower characters were improved with the application of 2, 4-D @ 15 ppm. Among interactions, ST-14 + GA_3 @ 300 ppm (V_1C_2) was found to be superior for yield, whereas the interaction of Kamala sundari + GA_3 @ 300 ppm (V_2C_6) was found to be superior for total sugars.

References

Anwar, W., T. Aziz, F. Naveed and Sahi, S.T. 2010. Foliar applied 2, 4-dichlorophenoxy acetic acid improved tomato growth and yield. *Soil and Environ.* 29(1): 77 – 81.

Avinash dhage, A., P. K. Nagre, K.K. Bhangre and Anand kumar, P. 2011. Effect of plant growth regulators on growth and yield parameters of Okra. *The Asian Journal of Horticulture*. 6 (1): 170-172.

Baijal, B.D., P. Kumar and Alka Siddique, M.A. 1983. Interaction of growth regulators and photoperiods on growth flowering, stolon development tuber interaction and yield in potato. *Indian Journal of Plant Physiology*. 26(1): 61-67.

Banerjee, N.C and Das, T.K. 1984. Effect of plant growth regulators on growth and tuber yield of potato. *South Indian Horticulture*. 32(2): 75-77.

Bhagure, Y.L and Tambe, T.B. 2015. Effect of seed soaking and foliar sprays of plant growth regulators on physiological and yield attributes of okra (*Abelmoschus esculentus* (L.) Moench.) Var. Parbhani Kranti. *The Asian Journal of Horticulture.* 10 (1): 31-35.

Brumbaugh, M.S., 2008. The effects of gibberellic acid on the growth of dwarf pea plants. *Biology 100 Laboratory Manual*. 6(3):79-81.

Chinalia, F.A., M. H. Regali-Seleghin and Correa, E. 2007. 2, 4-D Toxicity: cause, effect and control. *Terr. Aquat. Environ. Toxicol.* 1(1): 24-33.

Dheer singh, P.P. Singh, I.S. Naruka, S.S. Rathore and Shakawat, R.P.S. 2012. Effect of growth regulators on growth and yield of coriander. *Indian Journal of Horticulture.* 69(1): 91-93.

El-Tohamy, W.A., H.M. El-Abagy, M.A. Badr, S.D. Abou-hussein, Y.I. Helmy and Shafeek, M.R. 2015. Effects of yeast extract and GA_3 on water status, growth, productivity and quality of

sweet potato grown in sandy soils. *International Journal of Environment.* 4(4): 256-261.

Grossmann, K. 2007. Auxin Herbicide Action: Lifting the veil step by step. *Plant Signal. Behav.* 2(3): 421-425.

Huang, A.S., L. Tanudjaja and Lum, D. 1999. Content of alpha-beta- and dietary fibre in 18 sweet potato varieties grown in Hawaii. *Journal of Food Composition and Analysis.* 12(2): 147-151.

Jaymala singh,B.K.Singh, Anand Singh K. 2012. Performance of plant growth regulators on yield and yield attributing characters of okra (*Abelmoschus esculentus* (L.) Moench). *Environment and Ecology.* 30(4):1333-1335.

Kotecha, A.V., J.J.Dhruve and Vihol, N.J. 2011. Effect of foliar application of micronutrients and growth regulators on growth and yield of cabbage (*Brasicca oleracea* L. Var. capitata) Cv. Golden acre. *The Asian Journal of Horticulture*. 6(2): 381-384.

Mahabir Singh, R.P. Singh and Yadav, H.S. 1989. Response of growth regulators and their methods of application on yield of radish (*Raphanus sativus* L.). *Bharatiya Krishi Anusandhana Patrika.* 4(2): 84-88.

Mahesh and Sen, N.L. 2005. Effect of zinc, boron, gibberellic acid on growth and yield of okra (*Abelmoschus esculentus* L. Moench). *The Orissa Journal of Horticulture*. 33 (2):46-47.

Maurya, C.P and Lal, S. 1987. Effect of IAA, NAA and GA on growth and yield of onion (*Allium cepa* L.). *Bangladesh Horticulture.* 15(3): 203-206.

Natesh, N., B.S. Vyakaranahal, M. Shekhar Gouda and Deshpande, V.K. 2005. Influence of growth regulators on growth, seed yield and quality of chilli Cv. Byadgi kaddi. *Karnataka Journal of Agricultural Sciences.* 18(1): 36-38.

National Horticulture Board database. 2015. Chapter – II. Commodity wise status. *Indian Horticulture Database*. 194-197.

Padmavathi, G. 1998. Effect of plant growth regulators on productivity potential of onion. *M. Sc. (Agri.) Thesis*, University of Agricultural Sciences, Dharwad.

Patel, M.J., H. C. Patel and Chavda, J.C. 2010a. Influence of plant growth regulators and their application methods on yield and quality of onion (*Allium cepa* L.). *The Asian Journal of Horticulture.* 5(2): 263-265.

Patel, M.J., H.C. Patel and Chavda, J.C. 2010b. Effect of plant growth regulators and their application methods on growth and yield of onion (*Allium cepa* L.) Cv. gujarat white onion-1. *Adv. Res. J. Crop Improv.* 1(2): 85-87.

Ranjeet, R.B. Ram, Jayprakash and Meena, M.L. 2014. Growth, flowering, fruiting, yield and quality of tomato (*Lycopersicon esculentus* Mill.) as influenced plant bio regulators. *International Journal of Plant Sciences.* 9(1): 67-71.

Remison, S.U., D.O. Ewanlen and Okaka, V.B. 2002. Evaluation of cassava varieties and effects of growth regulators on vegetative traits and yield. *Tropical Agricultural Research and Extention.* 5(2): 1-2.

Ricard, D., Lardizabal, G. Thompson and Paul. 1990. Growth regulators combined with grafting increase flower number and seed production in sweet Potato. *Hortscience.* 25(1):79-81.

Roy, R and Nasiruddin, K.M. 2011. Effect of different level of GA_3 on growth and yield of cabbage. *J. Environ. Sci. and Natural Resources*. 4(2): 79-82.

Sargent, J.A. 1965. The penetration of growth regulators into leaves. *Annual Review of Plant Physiology*. 16(1):1-12.

Sawant, V.P., D.M. Naik, S.R. Barkule, A.M. Bhosale and Shinde, S.B. 2010. Effect of foliar application of growth

regulators on growth, yield and quality of cabbage Cv. Golden acre. *The Asian Journal of Horticulture* 5(2): 495-497.

Seema Sarkar, C.M. 2008. Interaction between GA_3 and CCC on yield and quality of sweet potato *International Journal of Plant Sciences.* 3(2): 477-479.

Sengupta, D.K., T.K. Maity and Dasgupta, B. 2008. Effect of growth regulators on growth and rhizome production of ginger (*Zingiber officinale* Rosc.) in the hilly region of Darjeeling district. *Journal of Crop and Weed.* 4(2): 10-13.

Shalaby, G.I., H.A. Hussein, I.A. Farag, Badawy, A.S. 1994. Promotion of flowering and induction of seed setting in sweet potato (*Ipomoea batatas* (L.) Lam.). *Asian Journal of Agricultural Sciences.* 25 (3): 83-95.

Singh, A.R and Choudary, B. 1989. Differential responses of three genera of cucurbits to boron and plant growth regulators. *Indian Journal of Horticulture*, 46 (1):215-221.

Singha, S.K. 2004. Studies on morphological and bio chemical characters of some minor fruits. Phd thesis, Bidhan Chandra Krishi Viswavidyalaya, pp115.

Tan and Swain, S.M. 2006. Genetics of flower initiation and development in annual and perennial plants. *Physiol. Plant.* 128(1): 8-17.

Thomson, T., G.S. Patel, K.S. Pandya, J.S. Dabhi and Yogesh pawar. 2015b. Effects of plant growth substances and antioxidants on growth, flowering, yield and economics of garden pea, *Pisum sativum* L. Cv Bonneville. *International Journal of Farm Sciences.* 5(1): 8-13.

Thondaiman Velayutham, and Parthiban, S. 2013. Role of growth regulators and chemicals on growth, yield and quality traits of Ginger (*Zingiber officinalis* Rosc.). *International Journal of Horticulture.* 3(16): 91-95.

Tirakannanavar, S., A.M. Shamsheer Ahmed, P.M. Munikrishnappa, L. Mukesh Chavan and Mastiholi, A.B. 2009. Effect of growth regulators and methods of application on growth, fruit and seed yield in Paprika Chilli (*Capsicum annum* L.) CV. Kt-Pl-19. *Seed Research.* 37(1and2): 14-19.

Uddain, J., K.M. Akhter Hossain, M.G. Mostafa and Rahman, M.J. 2009. Effect of different plant growth regulators on growth and yield of tomato. *International Journal of Sustainable Agriculture.* 1(3): 58-63.

Verma, P. 2000. Studies on effect of different plant growth regulators and their modes of application on growth, yield and quality of coriander (*Coriandrum sativum* L.) Cv. Rar.435. *Ph.d Thesis.* RCA, MPUAT, Udaipur.

Vijay Kumar and Ray, N. 2000. Effect of plant growth regulators on cauliflower Cv. Pant subhra. *Orissa Journal of Horticulture*. 28(1): 65-67.

Walter mutasa, Edmore gasura, Stanford mabasa, Ross tafadzwa masekesa and Dorren rudo masvodza. 2013. Does 2, 4-dichlorophenoxy acetic acid induce flowering in sweet potato? *African Journal of Biotechnology*. 12(51): 7057-7062.

How to cite this article:

Koteswara Rao, G., P. Ashok, D.V. Swami and Sasikala, K. 2017. Influence of Plant Growth Regulators on Growth, Root Tuber Yield and Quality of Orange Flesh Sweet Potato (*Ipomoea batatas* (L.) Lam.) Varieties. *Int.J.Curr.Microbiol.App.Sci.* 6(6): 2017-2025.
doi: https://doi.org/10.20546/ijcmas.2017.606.237