Available online at http://www.journalcra.com

International Journal of Current Research
Vol. 2, pp.096-097, March, 2010

INTERNATIONAL JOURNAL OF CURRENT RESEARCH

ISSN: 0975-833X

RESEARCH ARTICLE

VEGETATIVE PROPAGATION OF *Stevia rebaudiana* THROUGH STEM CUTTINGS

***,[1]Koppad, A. G. and [2]Manjunath Gouda**

[1]Associate professor (For. Engineering) College of Forestry, Sirsi- Karnataka
[2]M. Sc (Forestry) College of Forestry Sirsi-581 401

ARTICLE INFO

Article History:
Received 5th February, 2010
Received in revised form
28th February, 2010
Accepted 15th March, 2010
Published online 25th March, 2010

Key words:
Stevia rebaudiana,
Cuttings,
Growth promoter,
Branching.

ABSTRACT

The study was conducted at College of Forestry, Sirsi, Karnatak during 2005. Stevia three node stem cuttings of size 10-15 cm length and less than pencil thickness diameter were prepared. These cuttings were dipped in 100, 300 and 500 ppm of IAA and Coumarin for five minutes. After dipping the cuttings were planted in polythene bag of size 4" X 6" containing potting mixture at 2:1:1 ratio (Soil, sand and Farm yard manure respectively) and little vermiphos was also added to this mixture. These poly bags were kept in mist chamber for 35 days. Observations on number of roots and root length were recorded at 15, 25 and 35 days after planting. The study indicated that IAA and Comaorin 300 ppm concentration found suitable treatment for better rooting in Stevia. After 35 days of planting, significantly higher root length (7.40 cm) and number of roots were recorded with IAA 500 ppm followed by coumarin 500 ppm (7.00 cm). However coumarin 300 ppm (6.80 cm) and IAA 300 ppm (6.28 cm) were statistically on par with 500 ppm treatments respectively.

INTRODUCTION

One or the other forms of sugars are indispensable constituents of human food. The major source of sugar has long been from sugar cane and sugar beet and they are not advised to be taken by diabetes patients, for such people sugar obtained from stevia is considered to be the alternate source. The leaves of stevia contain sweetening compounds like, stevioside and rebaudioside, which have insulin-balancing properties (Singh *et al*., 1996). The leaves of stevia are 30 times sweeter than sugar. It regulates blood pressure, skin disease and prevents tooth decay and also used as an anti bacterial and anti viral agent (Singh *et al*., 1996). The leaves are free from calorie and carbohydrates, hence are preferred option for diabetes patients (Skaria *et al*., 1998). With the ever-increasing demand for the stevia it is necessary to propagate them in large scale for planting in the main field for commercial production. Stevia is poorly propagated through seeds and it is very difficult to propagate through stem cuttings without any growth regulator treatments. Propagation techniques of stevia stem cuttings are still to be standardized. The plant hormones such as Indole Acetic Acid (IAA) and Coumarin are known to help rooting of stem cuttings. Hence the study was undertaken to know the effect of different growth regulators to rooting of *Stevia* stem cuttings.

MATERIAL AND METHODS

The study was carried out at college of Forestry, Sirsi of Karnataka during the year 2005-06. The three node stem cuttings of less then pencil thickness and 10-15cm length were prepared from the plant material in early morning hours. The growth regulators viz., IAA and coumarin of 100 ppm, 300 ppm and 500 ppm concentration were prepared by dissolving the required quantity of IAA and coumarin in small quantity of ethyle alcohol and them mixing with proportionate quantity of water. The prepared cuttings were dipped in 100 ppm, 300 ppm and 500 ppm of IAA and coumarin solution for 5 minutes. After dipping the stem cuttings in growth regulators they were planted in polythene bag of size 4" X 6" containing potting mixture at 2:1:1 ratio (Soil, sand and Farm yard manure respectively) and vermiphos was added to this mixture. The seedlings were kept in mist chamber for 35 days. Stevia cuttings were evaluated for rooting and root length at 15, 25 and 35 days intervals by destructive sampling. Twenty cuttings were used for each treatment (140 plants per replication) the treatments were replicated thrice and kept in randomized block design. After recording observations at different intervals data were analyzed by using MSTATC programme.

***Corresponding author:** koppadag2007@rediffmail.com

RESULTS AND DISCUSSION

The number of roots developed in stevia cuttings at different intervals as influenced by growth regulator are given in Table 1. The results indicated that stems dipped in IAA 500 ppm and coumarin 300 ppm solution produced significantly higher number of roots at 15 days after treatment. Stem cuttings which are dipped in IAA 500 ppm concentration produced higher number of roots at 35 days after treatments. However, coumarine 300 ppm also showed the similar effect on root initiation as that of IAA 500. Cuttings dipped in IAA 300 ppm showed significantly higher number of roots at 25 and 35 days after treatment when compared to control. Similarly, coumarine 500 ppm also had shown higher number of roots at 25 and 35 days after treatment when compared to control. In general number of roots was higher in stevia cuttings which were dipped in IAA 500 ppm followed by coumarin 300 ppm. Similar results were obtained by study conducted by Carvalho *et al*. (1995) who opined that treating stem cuttings of stevia with IAA and IBA promoted rooting and increased the number of roots. The basal cuttings of *Gymnema sylvestrica, Coleous forskohli* and *Piper longum* also produced profuse rooting with the treatments of IAA 500 ppm (Sundharaiya *et al*., 2000). Root length in stem cuttings at different intervals as influenced by growth regulators are presented in Table 2. Stem cuttings dipped in IAA 500 ppm produced longer root length (0.64 cm) followed by coumarine 300 ppm (0.58 cm) at 15 days after treatment. However, the length of the root in IAA 300 and Coumarine

Table 1. Number of roots in stevia stem cuttings at different intervals as influenced by growth regulators

Treatment	Intervals in days		
	15	25	35
T1-IAA 100 ppm	1.00	6.66	10.66
T2- IAA 300 ppm	2.33	11.00	18.00
T3- IAA 500 ppm	3.66	18.66	22.66
T4-Coumarin 100 ppm	1.66	8.66	09.00
T5-Coumarin 300 ppm	3.33	13.33	20.33
T6-Coumarin 500 ppm	2.66	10.66	19.00
T7-Control	1.00	3.67	06.33
Mean	2.23	10.38	15.14
SEm ±	0.48	2.09	1.58
CD (5%)	1.47	6.42	4.86

Table 2. Root length (cm) in *Stevia* stem cuttings at different intervals as influenced by growth regulators

Treatment	Intervals in days		
	15	25	35
T1-IAA 100 ppm	0.15	0.93	3.83
T2- IAA 300 ppm	0.54	4.60	6.28
T3- IAA 500 ppm	0.64	6.20	7.40
T4-Coumarin 100 ppm	0.14	0.76	4.50
T5-Coumarin 300 ppm	0.58	2.40	6.80
T6-Coumarin 500 ppm	0.48	4.30	7.00
T7-Control	0.12	0.54	3.50
Mean	0.37	2.82	5.61
SEm ±	0.07	0.59	0.44
CD (5%)	0.24	1.82	1.37

500 ppm were found to be on par with IAA 500 ppm. But IAA 100 ppm and Coumarine 100 ppm did not show any influence on the root length at 15 days after treatment. At 25 days after treatment IAA 500 ppm produced longer roots (6.20 cm) in stevia cuttings followed by IAA 300 ppm (4.6 cm). Stem cuttings planted without any treatments (control) showed significantly lower root length (0.54 cm). After 35 days of planting, significantly higher root length (7.40 cm) was recorded with IAA 500 ppm followed by coumarin 500ppm (7.00 cm), coumarin 300ppm (6.80 cm) and IAA 300ppm (6.28 cm). IAA 100ppm and coumarin 100ppm recorded significantly lower root length in stevia and was on par with Control (3.50 cm). The result indicated that the stevia plant material is ready to plant in the main field after 25-35 days at nursery. With this method is was possible to produce the planting material of stevia with lower cost. As the rooted plant cost was 5 rupees each due to the nursety technique it was possible to produce the planting material with rupees one for each plant. The results are in line with the study conducted by Sharma and Kumar, (2003) who reported that treatment of one month old *Plumbago zeylanica* plants with IAA and GA produced higher number of roots and root length. The study conducted by Vijaykumari, (2002) also found that treatment on *Andrographis paniculata* seedlings with GA_3 and IAA produced significantly higher number of roots and root length.

Conclusion

The study revealed that among the treatments IAA 300 ppm and coumarin 300 ppm have produced higher number of roots and root length. Even though the 500 ppm concentration of these growth regulators produced higher number of roots and root length in Stevia but they are statistically on par with 300 ppm in both IAA and Coumarin. The plants are ready to plant in main field at 25-35 days after planting in the nursery.

Acknowledgement

Thanks to the National Medicinal Plant Board, New Delhi for the financial Assistance for conducting the research work.

REFERENCES

Carvalho Mam De., Zaidan Lbp. And De Carvalho mam. 1995. Propagation of *Stevia rebaudiana* from stem cuttings. Pesquisa-Agropecuaria-Brasileira, 30(2): 201-206.

Sharma, S. And Kumar, A. 2003. Improving growth and productivity of *Plumbago zeylnica*. National symposium on emerging trends in Indian medicinal plants, Central Institute for Medicinal and Aromatic Plants (CIMAP), Lucknow.

Singh, V.P, Farooqi, A. A. and Malathi, S. 1996. Stevia: A natural sweetener for the diabetics. Indian Journal of Arecanut, Spices and Medicinal Plants, 4(2): 24-27.

Skaria, B., Joseph, R., Mathew, G., Mathew, S. and Joy, P. P. 1998. Stevia- A sweet herb. Indian Journal of Arecanut, Spices and Medicinal Plants, 6(1): 24-27.

Sundharaiya, K., Ponnuswami, V. And Jasmine, J. A. 2000. Effect of growth regulators in thepropagation of *Gymnema sylvestrica*, *Coleus forskohli* and *Piper longum*. South Indian Horticulture, 48(1-6): 172-174.

Vijaykumari, B. 2002. Influence of foliar spray by GA and IAA on the growth attributes of *Andrographis paniculata*. Journal of Phytological Research, 15(2): 161-163.

****