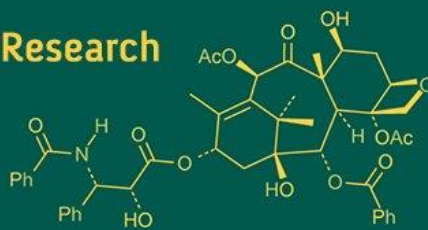
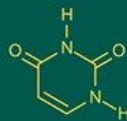
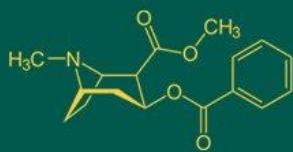


International Journal of Advanced Biochemistry Research



ISSN Print: 2617-4693
ISSN Online: 2617-4707
NAAS Rating (2025): 5.29
IJABR 2025; SP-9(10): 2045-2047
www.biochemjournal.com
Received: 02-08-2025
Accepted: 06-09-2025

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Effect of number of nodes and IBA concentration on growth parameters of little gourd cutting (*Coccinia grandis* L.)

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DOI: <https://www.doi.org/10.33545/26174693.2025.v9.i10Sy.6154>

Abstract

An experiment was conducted to evaluate the effect of varying node numbers and indole-3-butyric acid (IBA) concentrations on the growth parameters of cuttings. The study was conducted with completely randomized design with factorial concept comprising 12 treatment combinations: three node numbers-two (N_1), three (N_2) and four (N_3) nodes and four IBA concentrations-250 ppm (I_1), 500 ppm (I_2), 750 ppm (I_3) and 1000 ppm (I_4), each replicated three times. Results showed that cuttings with four nodes (N_3) produced the highest number of branches (4.74, 6.75, 7.82, 8.06), leaves (12.75, 17.87, 23.47, 29.21) and vine length (135.67 cm, 149.42 cm, 169.54 cm, 171.63 cm) at 30, 45, 60 and 75 days after planting. Among the IBA treatments, 250 ppm (I_1) recorded the highest number of leaves (10.61, 15.29, 22.53, 28.06), branches per cutting (3.77, 6.27, 6.43) and vine length (113.99 cm, 140.95 cm, 154.52 cm) at 30, 60 and 75 DAP. The combination of four nodes and 250 ppm IBA (N_3I_1) resulted in the highest branches (5.43, 7.31, 8.74, 9.25), leaves (13.48, 19.55, 25.91, 33.30) and vine length (161.41 cm, 184.27 cm, 192.25 cm, 207.93 cm) at 30, 45, 60 and 75 DAP. Thus, four-node cuttings treated with 250 ppm IBA showed superior growth performance across vegetative parameters.

Keywords: Little gourd, IBA concentration, number of node

Introduction

Little gourd, a member of the family Cucurbitaceae and the genus *Coccinia* comprising about 35 species, is believed to have originated in India. It is commonly referred to by several names such as tindora, kundri, kovakkai, baby watermelon, and gentleman's toes.

In Gujarat cucurbits mainly grown in Surat, Anand, Kheda, Mahesana, Vadodara, Banaskantha and Rajkot. In Gujarat total area under cucurbits cultivation is around 12.62 lakh hectares and total annual production with 19.31 lakh MT and productivity 15.30 MT/ha. In India, little gourd is widely grown in southern, eastern and western regions mainly in states like Gujarat, Karnataka, Tamil Nadu, Andhra Pradesh and Telangana (Anon., 2021) [2]. Little gourd remains in high demand because it is available for most of the year (February to October). Therefore, large-scale multiplication is needed to meet consumer demand. Although both sexual and asexual methods are available for its multiplication, sexual propagation has certain drawbacks. Hence, the crop is more efficiently raised through conventional vegetative methods, which can ensure an abundant and timely supply of planting material at the beginning of the season.

Seed propagation in little gourd is generally avoided because it results in low germination and late flowering. Although only about 10% male plants are required for effective pollination and fruit set, more than half of the plants produced from seed turn out to be non-fruited males. Poor seed viability and weak seedling establishment further make sexual propagation unsuitable for commercial cultivation. In comparison, vegetative propagation using stem cuttings provides a more reliable and efficient option for large-scale production of little gourd.

Although little gourd is multiplied through vegetative means, the lack of a standardized protocol and the poor efficiency of conventional techniques have resulted in limited availability of planting material in the market. Hence, there is a need to establish a fast and reliable multiplication method with a high success rate.

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Materials and Methods

The experiment was carried out at the Hi-tech Horticulture Park, College of Horticulture, Junagadh Agricultural University, Junagadh, from July 2023 to September 2023. Little gourd cuttings were collected from Vegetable Farm of Navsari Agricultural University, Navsari. Total twelve treatment combinations comprising three level of node number viz., two nodes (N_1), three nodes (N_2), four nodes (N_3) and four level of IBA concentration viz., 250 ppm (I_1), 500 ppm (I_2), 750 ppm (I_3) and 1000 ppm (I_4) were allocated in completely randomized design with factorial concept in three repetition. Cuttings were taken from one-year-old little gourd plants, and a slant cut was made at the base of each cutting. A slant cut was given at the base of the each cuttings. The IBA concentration were prepared by dissolving 0.250 g, 0.500 g, 0.750 g and 1 g of respective growth regulator in small quantity of ethyl alcohol and the volume was made up to 100 ml by adding distilled water. The potting medium consisted of soil, FYM, and vermicompost mixed in equal proportions (1:1:1). Polyethylene bags of 8 × 10 cm size were filled with this mixture. Observations were recorded from five randomly selected plants per treatment in each replication.

Results and Discussion

Sprouting parameter

Maximum sprouts per cutting (4.15) were observed in four nodes cutting (N_3), these might be due to number of buds increased and these acted as source of hormones for sprouting, this result was supported by Amoah (1997) ^[1] in sweet potato. The maximum number of sprouts per cutting (4.11) was found with 250 ppm IBA (I_1). This might be due to IBA application, which affected cell division in the vascular cambium, cell expansion and control of differentiation into different types of cambium may have contributed to the higher number of sprouts formed with the growth regulators. These results were collaborated by findings of Devi *et al.* (2016) ^[4] in phalsa. The interaction effect of the number of nodes and IBA treatment on the number of sprouts per cutting showed maximum (4.75) in four nodes per cutting treated with 250 ppm IBA (N_3I_1), these might be due to increased auxin concentration enhancing rooting and sprouting, consistent with Sharma *et al.* (2011) ^[7] in *Premna integrifolia*.

Growth Parameter

The maximum number of branches (5.43, 7.31, 8.74 and 9.25) was found in treatment combination four nodes cutting treated with 250 ppm IBA concentration (N_3I_1) at 30, 45, 60 and 75 DAP, respectively. This might be due to IBA, which increases number of shoots resulting in higher growth of cutting. Better nutrient availability and more number of shoots leading to higher production of photosynthetically functional leaves and growth of cutting. Similar findings were also reported by Khapre *et al.* (2015) ^[5] in fig.

The maximum number of leaves (13.48, 19.55, 25.91 and 33.30) was found in treatment combination four nodes + 250 ppm IBA concentration (N_3I_1) at 30, 45, 60 and 75 DAP, respectively. This might be due to the longer cutting has more carbohydrates accumulation which helps in vegetative growth of the seedlings as compared to shorter cuttings. The

lower concentration of IBA proved to be beneficial for producing more leaves. This agree with the findings of Mishra *et al.* (1983) ^[6] in small bitter gourd.

The maximum vine length (161.41, 184.27, 192.25 and 207.93 cm) was found in treatment combination four nodes cuttings treated with 250 ppm IBA concentration (N_3I_1) at 30, 45, 60 and 75 DAP, respectively. The results of present study are also in close conformity by Bhardwaj *et al.* (2017) ^[3] in little gourd.

Table 1: Effect of number of nodes and IBA concentration on sprouting parameter on little gourd cuttings

Treatment Combination		Number of sprouts per cuttings
N_1I_1	2 nodes + 250 ppm IBA concentration	3.07
N_1I_2	2 nodes + 500 ppm IBA concentration	3.27
N_1I_3	2 nodes + 750 ppm IBA concentration	3.23
N_1I_4	2 nodes + 1000ppm IBA concentration	3.53
N_2I_1	3 nodes + 250ppm IBA concentration	4.50
N_2I_2	3 nodes + 500 ppm IBA concentration	4.13
N_2I_3	3 nodes + 750 ppm IBA concentration	4.23
N_2I_4	3 nodes + 1000ppm IBA concentration	3.27
N_3I_1	4 nodes + 250 ppm IBA concentration	4.75
N_3I_2	4 nodes + 500 ppm IBA concentration	4.16
N_3I_3	4 nodes + 750 ppm IBA concentration	4.07
N_3I_4	4 nodes + 1000 ppm IBA concentration	3.64
S. Em. ±		0.112
C.D. at 5 %		0.32
C. V. %		5.08



N_3I_1 -Four nodes + 250 ppm IBA concentration



N_1I_1 -Two nodes + 250 ppm IBA concentration

Table 2: Effect of number of nodes and IBA concentration on sprouting parameter on little gourd cuttings

Treatment Combination		Number of branches				Number of leaves				Vine length			
		30 DAS	45 DAS	60 DAS	75 DAS	30 DAS	45 DAS	60 DAS	75 DAS	30 DAS	45 DAS	60 DAS	75 DAS
N ₁ I ₁	2 nodes + 250 ppm IBA concentration	2.65	3.49	3.87	4.57	7.54	11.91	20.09	24.60	77.80	102.42	103.22	123.95
N ₁ I ₂	2 nodes + 500 ppm IBA concentration	2.66	3.52	3.57	5.40	7.47	12.76	21.36	26.18	81.03	125.38	123.97	143.43
N ₁ I ₃	2 nodes + 750 ppm IBA concentration	2.47	3.75	3.35	4.73	7.69	12.56	21.64	29.31	97.35	122.05	123.40	136.33
N ₁ I ₄	2 nodes + 1000ppm IBA concentration	2.67	3.46	4.02	4.60	7.03	12.59	21.09	28.64	91.90	120.09	134.74	137.70
N ₂ I ₁	3 nodes + 250 ppm IBA concentration	3.24	5.38	6.20	5.47	10.81	14.42	21.58	26.29	102.78	136.15	133.09	131.67
N ₂ I ₂	3 nodes + 500 ppm IBA concentration	3.90	5.30	6.63	5.66	11.00	14.68	22.34	26.39	104.75	134.40	137.82	144.94
N ₂ I ₃	3 nodes + 750 ppm IBA concentration	3.53	6.18	6.20	5.84	10.43	14.31	22.49	24.20	108.16	139.54	134.42	137.54
N ₂ I ₄	3 nodes + 1000ppm IBA concentration	3.63	5.88	6.50	6.15	10.67	14.27	22.52	24.09	107.16	138.74	141.74	137.04
N ₃ I ₁	4 nodes + 250 ppm IBA concentration	5.43	7.31	8.74	9.25	13.48	19.55	25.91	33.30	161.41	184.27	192.25	207.93
N ₃ I ₂	4 nodes + 500 ppm IBA concentration	4.41	6.74	7.17	7.90	12.24	16.90	22.32	27.32	126.77	144.71	166.19	154.16
N ₃ I ₃	4 nodes + 750 ppm IBA concentration	4.47	6.81	7.77	7.59	12.15	17.46	23.10	28.14	131.76	145.73	160.69	162.02
N ₃ I ₄	4 nodes + 1000 ppm IBA concentration	4.64	6.13	7.60	7.47	13.13	17.57	22.53	28.08	122.73	122.98	159.01	162.40
S. Em. ±		0.144	0.237	0.253	0.283	0.283	0.500	0.581	0.920	4.898	5.869	5.777	5.671
C.D. at 5 %		0.41	0.67	0.72	0.81	0.80	1.42	1.65	2.62	13.94	16.71	16.44	16.14
C. V. %		6.85	7.69	7.35	7.89	4.75	5.81	4.52	5.85	7.75	7.55	7.02	6.63

N₃I₁-Four nodes + 250 ppm IBA concentrationN₁I₁-Two nodes + 250 ppm IBA concentration

250 ppm IBA concentration using the quick dip method (for 5 minutes) showed the best results for all growth-related parameters.

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Acknowledgement

The authors sincerely thank the Department of Vegetable Science, College of Horticulture, Junagadh Agricultural University, Junagadh, for their valuable support and important contributions to this research.

Conclusion

It can be concluded that the number of nodes on cuttings and IBA concentration significantly affected the growth of little gourd cuttings. Cuttings with four nodes treated with