

## Studies on the influence of plant growth regulators on growth and yield of turmeric (*curcuma longa* L.)

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### ABSTRACT

An experiment was conducted to find out the effect of growth regulators on growth and yield of turmeric with four treatments of growth regulators viz.  $G_1$  (Cycocel 1000ppm),  $G_2$  (6- BA 5 ppm),  $G_3$  (NAA 20 ppm) and  $G_4$  (Control) which were replicated three times. Among the growth regulators used  $G_3$ (NAA 20 ppm) recorded maximum (80.84cm) plant height, number of leaves per tiller (26.32) and other vegetative parameters, yield per clump (295.41g), yield per plot (8.08kg) and yield per hectare (18.08 t/ha)at 180 DAP.

**Keywords:** Turmeric rhizome sizes, Growth regulators, Growth and Yield attributes

Turmeric (*Curcuma longa* L.) is an important, sacred and ancient spice of India. It is a major rhizomatous spice produced and exported from India. Turmeric is a herbaceous perennial plant, native to tropical South-East Asia, belonging to the family zingiberaceae, under the order scitaminae. It is cultivated for its underground rhizomes which is used as spice and condiment, dye stuff and in cosmetic and drug industry, particularly in the preparation of anticancerous medicines (Srivastava et al., 2003). India is the world's largest producer and exporter of turmeric and it produces nearly 50 per cent of global turmeric production. It is grown in an area of 1.92 lakh hectares with an average production of 8.93 lakh MT (Anon., 2012).The cost of planting material amounts to 50 per cent of crop production in turmeric. Studies on the use of different growth regulators are

scanty. Hence there is a need to study the effect of different growth regulators on turmeric to know the best suited growth regulator for getting higher yields under field condition. Objective of this study was to know the effect of use of growth regulators on the growth, yield and quality of turmeric.

### MATERIALS AND METHODS

The study was carried out in the field of Directorate of Research, BCKV, Nadia, West Bengal There were four growth regulators viz.  $G_1$  (Cycocel 1000ppm),  $G_2$  (6- BA 5 ppm),  $G_3$  (NAA 20 ppm) and  $G_4$  (Control) used for the experiment. The field trial was laid out in Factorial RBD and was replicated three times at spacing of 25 cm between rows and 25 cm between the plants (ridge and furrow method) was followed. Observations on growth

**Table 1: Effect of growth regulators on various parameters of growth and yield in Turmeric var.Suguna**

Treatments	Plant Height (cm)	Pseudostem girth (mm)	Number of leaves plant <sup>-1</sup>	Leaf area (cm <sup>2</sup> )	Number of tillers clump <sup>-1</sup>	Harvest Index (%)	Number of rhizome clump <sup>-1</sup>	Diameter of rhizome clump <sup>-1</sup> (mm)	Clump size (cm <sup>2</sup> )	Yield (g clump <sup>-1</sup> )	Yield (Kg plot <sup>-1</sup> )	Yield (t ha <sup>-1</sup> )
G1:Cycocel 1000 ppm	65.60	6.67	19.04	190.01	4.40	75.16	23.61	22.67	28.79	214.26	4.24	10.77
G2: 6-BA 5 PPM	73.59	7.12	21.04	212.82	4.06	76.92	27.25	25.73	36.16	222.13	5.99	14.13
G3: NAA 20 PPM	80.84	7.09	26.32	288.38	5.63	88.01	31.03	29.02	42.37	295.41	8.08	18.08
Control	67.73	6.72	21.04	202.72	4.65	73.52	23.68	23.33	37.23	219.77	5.36	13.44
SEm(±)	1.36	0.11	0.33	4.19	0.13	1.48	0.46	0.45	0.66	9.00	0.27	0.35
LSD(0.05)	4.61	NS	1.126	14.203	0.44	5.03	1.55	1.53	2.23	30.49	0.92	1.17

parameters were recorded on five randomly selected clumps in each treatment at monthly intervals starting from 30 days after planting (DAP) till harvest i.e. upto 180 days after planting (DAP).

## RESULTS AND DISCUSSION

Experimental results indicated that among the different growth regulators G<sub>3</sub> (NAA 20 ppm) recorded maximum (80.84cm) plant height, number of leaves/tiller (26.32), leaf area (288.38cm<sup>2</sup>), number of tillers/clump (5.63), harvest index (88.01%), number of rhizomes/clump (31.03), diameter of rhizome clump (29.02mm), clump size (42.37cm<sup>2</sup>), yield/ clump (295.41g), yield/ plot (8.08kg) and yield per hectare (18.08 t/ha) at 180 DAP. But the pseudostem growth non-significant effect by the use of growth regulators (Table 1).

Growth regulator, NAA 20 ppm which influenced fresh rhizome yield and yield attributes significantly, may be attributed to its formative effect on cell elongation, cell division and better vegetative growth in terms of plant height, number of leaves and leaf area, which might have influenced the production of more number of rhizomes, diameter and size of clump, finally leading to increase in fresh rhizome yield in turmeric. Synthesis of more photosynthates due to better growth and translocation into sink might have resulted in better yield of rhizomes. The results obtained in present investigation are in conformity with the reports of Dhanoji (2010), Sengupta *et al.* (2008), Mannikeri (1996) and Jirali *et al.* (2008).

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