

Original Research Article

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## Effect of Growth Regulators on Growth and Yield of Turmeric var. Suroma

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### ABSTRACT

#### Keywords

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An experiment was conducted to find out the effect of different growth regulators on growth and yield of turmeric, with four treatments replicated three times. Among the different treatments evaluated for growth and yield of turmeric, the treatment G<sub>3</sub> (NAA 20 ppm) recorded maximum (80.84 cm) plant height, number of leaves per tiller (26.32), leaf area (288.38cm<sup>2</sup>), number of tillers per clump (5.63), harvest index (88.01%), number of rhizomes per clump (31.03), diameter of rhizome clump (29.02 mm), clump size (42.37 cm<sup>2</sup>), yield per clump (295.41g), yield per plot (8.08 kg) and yield per hectare (18.08 t/ha) at 180 DAP and the treatment G<sub>1</sub> (Cycocel 1000 ppm) recorded least (65.60 cm) plant height, number of leaves per tiller (19.04), leaf area (190.01 cm<sup>2</sup>), number of tillers per clump (4.40), number of rhizomes per clump (23.61), diameter of rhizome clump (22.67 mm), clump size (28.79 cm<sup>2</sup>), yield per clump (214.26 g), yield per plot (4.24 kg) and yield per hectare (10.77 t/ha) but the harvest index was lowest (73.52 %) in G<sub>4</sub> (Control) at 180 DAP.

### Introduction

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 an 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. 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 (Anonymous, 2012).

The cost of planting material amounts to 50 % 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 to know the best suited growth regulator for getting higher yields under field condition.

## Materials and Methods

The study was carried out in the field of Plantation, Spices, Medicinal and Aromatic Crops of Kittur Rani Chennamma College of Horticulture Arabhavi during May of 2012-2013. There were three treatments G<sub>1</sub> (Cycocel 1000ppm), G<sub>2</sub> (6- BA 5 ppm), G<sub>3</sub> (NAA 20 ppm) and G<sub>4</sub> (Control) were used for the experiment.

The field trial was laid out in RBD and was replicated three times at spacing of 45 cm between rows and 22.5 cm between the plants (ridge and furrow method) was followed, accommodating 98,765 plants per hectare. Observations on growth 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 the treatment G<sub>3</sub> (NAA 20 ppm) recorded maximum (80.84 cm) plant height, number of leaves per tiller (26.32), leaf area (288.38cm<sup>2</sup>), number of tillers per clump (5.63), harvest index (88.01%), number of rhizomes per clump (31.03), diameter of rhizome clump

(29.02 mm), clump size (42.37 cm<sup>2</sup>), yield per clump (295.41g), yield per plot (8.08 kg) and yield per hectare (18.08 t/ha) at 180 DAP and the treatment G<sub>1</sub> (Cycocel 1000 ppm) recorded least (65.60 cm) plant height, number of leaves per tiller (19.04), leaf area (190.01 cm<sup>2</sup>), number of tillers per clump (4.40), number of rhizomes per clump (23.61), diameter of rhizome clump (22.67 mm), clump size (28.79 cm<sup>2</sup>), yield per clump (214.26 g), yield per plot (4.24 kg) and yield per hectare (10.77 t/ha) but the harvest index was lowest (73.52 %) in G<sub>4</sub> (Control) at 180 DAP. But the pseudo stem growth was found to be non-significant.

Growth attributes such as plant height, pseudostem girth, number of leaves per tiller, leaf area, number of tillers per clump, harvest index, number of rhizomes per clump, diameter of rhizome clump, clump size, yield parameters were highest in treatment G<sub>3</sub> (NAA 20 ppm) which may be attributed to the formative effect of cell elongation and cell division. The result of present study is in conformity with results of (Dhanoji, 2010) and (Sengupta *et al.*, 2008) who recorded similar results with respect to the effects of growth regulators on vegetative parameters in ginger (Table 1 and 2).

**Table.1** Effect of growth regulators on the plant height, pseudo stem girth, number of leaves per tiller, leaf area, number of tillers per clump and harvest index in turmeric var. Suroma

Treatment	Plant height (cm)	Pseudo stem girth (mm)	No. of leaves per plant	Leaf area (cm <sup>2</sup> )	No. of tillers/ clump	Harvest index (%)
G <sub>1</sub> : Cycocel 1000 ppm	65.60	6.67	19.04	190.01	4.40	75.16
G <sub>2</sub> : 6- BA 5 ppm	73.59	7.12	21.04	212.82	4.06	76.92
G <sub>3</sub> : NAA 20 ppm	80.84	7.09	26.32	288.38	5.63	88.01
G <sub>4</sub> : Control	67.73	6.72	21.04	202.72	4.65	73.52
S.Em ±	1.36	0.11	0.33	4.19	0.13	1.48
CD @ 5 %	4.61	NS	1.126	14.203	0.44	5.03

**Table.2** Effect of types of rhizome sizes on the number of rhizomes per clump, diameter of rhizome per clump, clump size, yield per clump, yield per plot and yield per hectare in turmeric var. Suroma

Treatment	Number of rhizomes per clump	Diameter of rhizome clump (mm)	Clump size (cm <sup>2</sup> )	Yield (g/clump)	Yield (kg/plot)	Yield (tons/ ha)
G <sub>1</sub> : Cycocel 1000 ppm	23.61	22.67	28.79	214.26	4.24	10.77
G <sub>2</sub> : 6- BA 5 ppm	27.25	25.73	36.16	222.13	5.99	14.13
G <sub>3</sub> : NAA 20 ppm	31.03	29.02	42.37	295.41	8.08	18.08
G <sub>4</sub> : Control	23.68	23.33	37.23	219.77	5.36	13.44
S.Em ±	0.46	0.45	0.66	9.00	0.27	0.35
CD @ 5 %	1.55	1.53	2.23	30.49	0.92	1.17

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 Jirali *et al.*, (2008), Balwinder and Gill (2010) and Obasi and Atanu (2005).

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