

Research  
Paper

## Organic farming of turmeric (*Curcuma longa*) in Central India

B.J. JADHAO, P.S. JOSHI AND G.V. CHAUDHARI

See end of the article for authors' affiliations

Correspondence to :

**P.S. JOSHI**  
Department of  
Horticulture,  
Dr. Panjabrao Deshmukh  
Krishi Vidyapeeth,  
AKOLA (M.S.) INDIA  
Email: psjoshi175@gmail.com

### ABSTRACT

Turmeric is very important spice crop commercially grown throughout the country from last many centuries; it has used in various commercial industries as well as in pharmaceutical industries. It has a great demand in domestic as well as in international markets, due to its wider adaptability and also various schemes sponsored by Spice Board of India and National Horticulture Mission. Its acreage significantly increased in last few years especially in central India. Considering the importance of this crop, the present experiment was undertaken at Department of Horticulture, Dr.PDKV Akola to explore the possibility of organic farming in turmeric and standardization of organic manures for quality as well as export oriented production of turmeric. The initial results were found promising and it was suppose to confirm that application of vermicompost @ 13.5 t/ha application resulted in better vegetative growth performance, where as application of FYM @ 20 t/ha was found to be better for yield attributing characters in turmeric.

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**Key words :** Turmeric, Organic manures, Organic farming of turmeric

## INTRODUCTION

Turmeric (*Curcuma longa*) is very important spice crop commercially grown throughout the country. It is used in various commercial industries as well as in pharmaceutical industries. It has a great demand in domestic as well as in international markets, due to its wider adaptability and also various schemes sponsored by spice board of India and National Horticulture Mission. Its acreage significantly increased in last few years especially in Central India.

Turmeric being a rhizomatous crop requires a heavy input of fertilizers. Owing to the high cost of fertilizers and sustainable soil management, demanded the organic farming in turmeric. Considering the importance of this crop, the present experiment was undertaken to explore the possibility of organic farming in turmeric and standardization of organic manures for quality as well as export oriented production of turmeric.

## MATERIALS AND METHODS

The experiment was conducted at Department of Horticulture, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola. Experiment was laid out in Randomized Block Design with three replications. The treatments were T<sub>1</sub> – RDF (200 + 100 + 100 kg NPK ha<sup>-1</sup>), T<sub>2</sub> – Neem cake (4 t ha<sup>-1</sup>), T<sub>3</sub> – Safflower cake (4 t ha<sup>-1</sup>), T<sub>4</sub> – Vermicompost (13.5 t ha<sup>-1</sup>), T<sub>5</sub> – Farm yard manure (20 t ha<sup>-1</sup>), T<sub>6</sub> – Poultry manure (13.5 t ha<sup>-1</sup>), T<sub>7</sub> – Sheep and goat manure (20 t ha<sup>-1</sup>), T<sub>8</sub> – castor cake (4.6 t ha<sup>-1</sup>), T<sub>9</sub> – Fish meal (2.85 t ha<sup>-1</sup>) and T<sub>10</sub> – Control. Turmeric rhizomes were planted in plot size of 5.40 x 4.50 m<sup>2</sup> (Gross plot) and 4.95 x 4.25 m<sup>2</sup> (Net plot) at the sides of ridges with spacing of 45 x 25 cm. Initial soil status was soil pH (8.57), soil EC (0.38 dSm<sup>-1</sup>), organic carbon (0.73%), available N, P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O (157.89, 20.16 and 418.88 kg ha<sup>-1</sup>, respectively.

Calculated quantity of fertilizers were applied as per the treatments. Urea, single super phosphate and muriate of potash were used as source of N, P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O, respectively for T<sub>1</sub> treatment. One fifth of N and K<sub>2</sub>O

and full dose of  $P_2O_5$  were applied as basal dose. The remaining quantity of N and  $K_2O$  were applied as top dressing in split doses of 30, 60, 90 and 120 days after planting. Calculated quantities of respective organic manures were also applied as per the treatment keeping T10 as control (Without any application of manures/fertilizers) treatment.

Growth, yield and quality parameters were recorded with following observations:

#### Growth:

Height of plant, number of leaves, girth of stem, number of tillers, length of leaf, breadth of leaf.

#### Yield:

Yield of mother rhizome/plant, yield of mother rhizome/ ha, yield of fresh finger/plant, yield of fresh finger/ ha.

#### Quality:

Number of mother rhizome/ plant, weight of mother rhizome/ plant, length of mother rhizome/plant, girth of mother rhizome/plant, number of fresh finger/plant, weight of fresh finger/plant, length of fresh finger/plant and girth of fresh finger/ plant.

The data were analyzed and interpreted.

## RESULTS AND DISCUSSION

Different organic manures were applied to the turmeric crop by compensating the quantity of recommended dose of nitrogen and compared with the recommended dose of NPK. The significant result was found in respect of plant height, number of leaves, girth of

stem, number of tillers and leaf size.

The growth and yield parameters were found to be significantly influenced by different treatments.

#### Effect on growth:

It is revealed from the Table 1 that, the treatment vermicompost ( $13.5 \text{ t ha}^{-1}$ ) was found significantly superior over rest of the treatments as, regard the growth parameters viz., plant height (88.33 cm), number of leaves (10.7), girth of stem (1.93 cm), number of tillers (4.2) and leaf size except the treatment with RDF for number of tillers (3.9) which was at par. Minimum performance was found in control treatment. Close result was found by Mannikeri (2006) in which he reported that application of vermicompost (@  $15.65 \text{ t/ ha}$ ) was found superior for all growth parameters.

#### Effect on yield:

It was observed from the data in Table 2 that, the significant results were found in respect of the entire yield contributing parameters. Significantly maximum mother rhizomes  $\text{plant}^{-1}$  (4.06) was found with the application of FYM  $20 \text{ t ha}^{-1}$  which was at par with vermicompost (3.86), sheep and goat manure (3.86) and poultry manure (3.73). The similar trend was recorded in respect of weight of mother rhizome  $\text{plant}^{-1}$ , length of mother rhizome, girth of mother rhizome, number of fresh fingers  $\text{plant}^{-1}$ , weight of fresh fingers  $\text{plant}^{-1}$ , length and girth of fingers.

The significantly maximum yield of mother rhizome and fresh finger (Table 3) was recorded by the application of FYM  $20 \text{ t ha}^{-1}$  ( $77.315 \text{ kg}$  and  $367.63 \text{ q ha}^{-1}$ , respectively) which was significantly superior over rest of the treatments, Kadam *et al.* (2010) reported highest green rhizome yield of turmeric in GRDF which was at

**Table 1: Growth of Turmeric as influenced by the application of different organic manure**

Abbr.	Treatments	Height of plant (cm)	No. of leaves	Girth of stem (cm)	No. of tillers	Length of leaf (cm)	Breadth of leaf (cm)
T <sub>1</sub>	RDF 200+100+100 Kg NPK $\text{ha}^{-1}$	80.73	9.8	1.78	3.9	40.73	15.48
T <sub>2</sub>	Neem cake $4 \text{ t ha}^{-1}$	77.20	7.8	1.67	2.9	38.73	14.07
T <sub>3</sub>	Safflower cake $4 \text{ t ha}^{-1}$	73.26	7.4	1.64	2.5	36.26	13.86
T <sub>4</sub>	Vermicompost $13.5 \text{ t ha}^{-1}$	88.33	10.7	1.93	4.2	43.26	17.26
T <sub>5</sub>	Farm Yard Manure $20 \text{ t ha}^{-1}$	78.86	9.1	1.71	3.5	39.60	14.76
T <sub>6</sub>	Poultry manure $13.5 \text{ t ha}^{-1}$	78.06	8.4	1.68	3.2	39.00	14.36
T <sub>7</sub>	Sheep and Goat manure $20 \text{ t ha}^{-1}$	78.26	8.6	1.69	3.3	39.53	14.68
T <sub>8</sub>	Caster cake $4.6 \text{ t ha}^{-1}$	75.10	7.5	1.66	2.8	38.66	13.95
T <sub>9</sub>	Fish meal $2.85 \text{ t ha}^{-1}$	77.40	8.0	1.67	3.1	38.80	14.15
T <sub>10</sub>	Control	66.96	7.2	1.62	2.1	35.60	13.53
	S.E. $\pm$	1.54	0.18	0.05	0.12	0.744	0.475
	C.D. (P=0.05)	4.32	0.53	0.14	0.34	2.091	1.336

**Table 2: Yield parameters of Turmeric as influenced by the application of different organic manure**

Abbr.	Treatments	No. of mother rhizome/ plant	Wt. of mother rhizome/ plant (g)	Length of mother rhizome/ plant (cm)	Girth of mother rhizome / plant (cm)	No. of fresh finger / plant	Weight of fresh finger / plant (g)	Length of fresh finger/ plant (cm)	Girth of fresh finger/ plant (cm)
T <sub>1</sub>	RDF 200+100+100 Kg NPK ha <sup>-1</sup>	3.66	79.86	7.18	9.72	9.73	260.92	9.96	7.38
T <sub>2</sub>	Neem cake 4 t ha <sup>-1</sup>	3.40	73.55	5.84	9.50	9.60	255.87	8.84	6.86
T <sub>3</sub>	Safflower cake 4 t ha <sup>-1</sup>	3.00	62.37	5.23	8.65	8.73	244.69	7.78	6.48
T <sub>4</sub>	Vermicompost 13.5 t ha <sup>-1</sup>	3.86	97.81	8.05	12.42	13.73	285.56	11.19	8.89
T <sub>5</sub>	Farm Yard Manure 20 t ha <sup>-1</sup>	4.06	106.48	8.57	13.83	13.86	316.32	11.82	9.72
T <sub>6</sub>	Poultry manure 13.5 t ha <sup>-1</sup>	3.73	82.65	7.41	11.19	10.00	263.78	10.21	7.81
T <sub>7</sub>	Sheep and Goat manure 20 t ha <sup>-1</sup>	3.86	86.67	7.97	11.98	10.66	278.47	10.94	8.44
T <sub>8</sub>	Caster cake 4.6 t ha <sup>-1</sup>	3.00	71.53	5.62	8.85	9.13	248.63	8.49	6.67
T <sub>9</sub>	Fish meal 2. 85 t ha <sup>-1</sup>	3.53	76.12	6.96	9.72	9.63	257.53	9.69	7.16
T <sub>10</sub>	Control	2.73	58.46	4.85	6.69	8.40	116.42	7.18	5.48
	S.E.	0.138	1.769	0.163	0.030	0.705	2.720	0.284	0.228
	C.D. (P=0.05)	0.390	4.970	0.469	0.085	1.981	7.640	0.498	0.641

**Table 3: Yield of Turmeric as influenced by the application of different organic manure**

Abbr.	Treatments	Yield of mother rhizome/ plant (kg)	Yield of mother rhizome/ ha (q)	Yield of fresh finger / plant (kg)	Yield of fresh finger / ha (q)
T <sub>1</sub>	RDF 200+100+100 Kg NPK ha <sup>-1</sup>	6.875	32.67	67.876	322.75
T <sub>2</sub>	Neem cake 4 t ha <sup>-1</sup>	5.750	27.33	55.490	263.85
T <sub>3</sub>	Safflower cake 4 t ha <sup>-1</sup>	4.285	20.37	47.140	224.15
T <sub>4</sub>	Vermicompost 13.5 t ha <sup>-1</sup>	8.780	41.74	74.948	356.38
T <sub>5</sub>	Farm yard manure 20 t ha <sup>-1</sup>	10.475	79.80	77.315	367.63
T <sub>6</sub>	Poultry manure 13.5 t ha <sup>-1</sup>	7.045	33.49	69.948	332.60
T <sub>7</sub>	Sheep and goat manure 20 t ha <sup>-1</sup>	7.565	35.96	72.536	344.91
T <sub>8</sub>	Caster cake 4.6 t ha <sup>-1</sup>	4.855	23.08	52.670	250.45
T <sub>9</sub>	Fish meal 2. 85 t ha <sup>-1</sup>	6.325	30.07	62.184	295.68
T <sub>10</sub>	Control	4.115	19.56	26.980	128.29
	S.E.	0.714	1.434	0.574	2.732
	C.D. (P=0.05)	2.005	4.028	1.612	7.675

par with FYM 22 t/ ha.

Authors' affiliations:

**B.J. JADHAO AND G.V. CHAUDHARI**, Department of Horticulture, Dr. Punjabrao Deskmukh Krishi Vidyapeeth, AKOLA (M.S.) INDIA  
E-mail: chaudhari\_ganesh3@yahoo.in

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