

Article history :

Received : 14.02.2016

Revised : 10.05.2016

Accepted : 18.05.2016

Screening of turmeric (*Curcuma longa* L.) cultivars for quality in Southern dry zone of Karnataka

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ABSTRACT : An experiment was conducted to evaluate the performance of growth and yield parameters of sixteen cultivars of turmeric for commercial production in southern dry zone of Karnataka. The experiment was laid out in Randomized Complete Block Design (RCBD) with three replications at the farm of College of Horticulture, Mysore. Among the sixteen turmeric cultivars grown in southern dry zone of Karnataka, Maximum fresh rhizome yield of 33.67 t ha⁻¹ was observed in Salem at par with Rajapuri (32.67 t ha⁻¹), Prathibha (32.56 t ha⁻¹) and CLT-325 (32.49 t ha⁻¹), whereas highest cured rhizome yield was exhibited by Salem (8.31 t ha⁻¹), CLT-325 (7.98 t ha⁻¹) and Co-1 (7.01 t ha⁻¹). With respect to quality in terms of curcumin content, PTS-24, Prabha and Prathibha were superior (7.20 %, 6.45 % and 6.39 %, respectively).

KEY WORDS : Screening, Turmeric, Curcumin, Quality

HOW TO CITE THIS ARTICLE : Salimath, Siddalingayya, Venkatesha, J., Kotikal, Y.K. and Ravirajshetty, G. (2016). Screening of turmeric (*Curcuma longa* L.) cultivars for quality in Southern dry zone of Karnataka. *Asian J. Hort.*, 11(1) : 186-188, DOI : 10.15740/HAS/TAJH/11.1/186-188.

Turmeric is one of the important tropical rhizomatous spice crops, native to tropical South-East Asia and belongs to the family Zingiberaceae. It is believed to symbolise well being and good fortune. Hence, in India it is widely used in religious functions and ceremonies.

Curcuma longa L. contributed 96 per cent of total turmeric production and it is valued for deep yellow colour and aromatic flavour due to the presence of colouring matter 'curcumin'. In Karnataka, turmeric is cultivated largely in Chamarajnagar, Mysore, Belgaum, Bidar, Davangere, Dakshin Kannada, Mandya, Chickmagalore and Kodagu districts (Lokesh and Chandrakanth, 2003).

Lack of suitable cultivars for the particular agro-climatic condition is one of the reasons for its low productivity. Performance of the cultivars tested under different agro-climatic conditions has been reported by

Cholke (1993); Venkatesha (1994); Jagadish (2000); Anusuya (2004) and Hanchinamani (2012). Hence, present study was carried out evaluation of turmeric cultivars in Southern Dry Zone of Karnataka.

RESEARCH METHODS

The field experiment was carried out with nineteen cultivars of turmeric at College of Horticulture, Mysore during 2012-13. The cultivars are listed in Table 1. The trial was laid out in Randomised Complete Block Design with three replications using finger rhizomes as planting materials. Weight of rhizomes was 20-30 g, planting was done on 17th May 2012. A plot size of 2 m x 1.5 m with spacing of 30 x 25 cm was adopted. The crop was raised under irrigated conditions, farmyard manure was applied to each plot at the rate of 40 tonnes per hectare as basal dose. The fertilizers were applied at the rate of

150:125:250 kg h⁻¹. Nitrogenous and potash fertilizers applied at three equal doses at 45, 90 and 135 days after planting and phosphatic fertilizer was applied in two equal doses at 45 and 90 days after planting (Venkatesha, 1994). The experimental site consisted a red sandy loam soil. Observations on yield and quality attributes were recorded as and when the crop matured.

The curing percentage was worked out after curing and drying of the fresh turmeric. For curing one kilogram of whole finger rhizomes were used. The samples were boiled for 45 to 60 minutes. Then sun dried for eight to ten days. The dry weight was recorded after sun drying and curing percentage was worked using following formula :

$$\text{Curing percentage} = \frac{\text{Dry weight of rhizome after curing (kg)}}{\text{Fresh weight of rhizome (kg)}} \times 100$$

The curcumin content was estimated by adopting the method given by Manjunath *et al.* (1991). Cured rhizomes were grind to the fine powder and 0.1 g of grind powder was taken and mixed with 40 ml of distilled alcohol and keep it for 2 hr 30 minutes. Then the extract was transferred to a 100 ml volumetric flask and volume made with alcohol. Later, it was filtered and then an aliquot of 5 ml was transferred into a 100 ml volumetric flask, made the volume with alcohol and mixed the aliquot thoroughly. The absorbance of solution was measured

at 425 nm against alcohol blank. Using absorbance value of standard solution, curcumin content was calculated by adopting the following formula :

$$\text{Curcumin content} = \frac{0.00025 \times \text{abs. of sample} \times 100 \times 100}{\text{abs. of standard} \times \text{wt. of sample} \times 5} \times 100$$

RESEARCH FINDINGS AND DISCUSSION

Highly significant variations were noticed among the cultivars for yield and quality characters (Table 1). Maximum fresh rhizome yield was obtained from Salem (33.67 t ha⁻¹) which was an par with, Rajapuri (32.67 t ha⁻¹), Prathibha (32.56 t ha⁻¹) and CLT-325 (32.49 t ha⁻¹), while lowest yield of fresh rhizome was found with Krishna (16.75 t ha⁻¹).

Recovery percentage (driage) is an important factor as the fresh rhizome is to be cured to obtain marketable turmeric. Highest curing percentage was recorded in Salem (24.70 %) found to be on par with CLT-325 (24.51 %) and Erode local (24.16 %). The lowest curing percentage was recorded by cultivar Rajapuri (19.74 %) and CLI-14 (22.51 %). Cultivar Salem recorded highest cured yield 8.31 t ha⁻¹, which is on par with CLT-325 (7.3331 t ha⁻¹), while the lowest cured rhizome yield recorded in Krishna (3.4931 t ha⁻¹). Rao (1965) and Aiyadurai (1966) reported that variation in curing percentage was largely related to the varietal characters, genetic factors and environmental conditions under which

Table 1 : Fresh yield, curing percentage, cured yield and curcumin content of different cultivars of turmeric

Sr. No.	Cultivars	Fresh yield (t ha ⁻¹)	Curing percentage	Cured yield (t ha ⁻¹)	Curcumin content (%)
1.	Co-1	30.54	22.95	7.01	3.12
2.	Salem	33.67	24.70	8.31	4.56
3.	Prabha	21.54	23.37	5.04	6.45
4.	Krishna	16.75	20.89	3.49	2.75
5.	Rajapuri	32.67	19.74	6.44	4.62
6.	Prathibha	32.56	20.37	6.63	6.21
7.	PTS-24	26.65	20.16	5.37	7.20
8.	Cuddapah	29.59	22.64	6.69	3.61
9.	Alleppey	26.20	21.94	5.74	6.39
10.	Bidar-1	28.19	21.64	6.09	2.38
11.	Bidar-4	27.72	22.84	6.33	4.81
12.	CLI-327	25.96	22.06	5.72	4.48
13.	CLI-14	19.22	22.01	4.23	3.23
14.	CLT-325	32.49	24.51	7.98	5.76
15.	Bwlgaum Local	25.04	22.75	5.63	4.27
16.	Erode Local	28.93	24.16	6.98	3.60
	S.E. ±	0.52	0.36	0.39	0.26
	C.D. (P=0.05)	1.50	1.03	1.12	0.75

they were grown and the similar variation in curing percentage was also reported by Pujari *et al.* (1987) and Jadhao *et al.* (2005). The variation in the cured rhizome yield is largely attributed to differences in the fresh rhizome yield as well as curing percentage.

The cultivar PTS-24 (7.20%) was found superior at par with Prabha (6.45%) followed by Alleppey (6.39%), Prathibha (6.21%) and CLT-325 (5.76%). The least curcumin content was registered in cultivar Bidar-1 (2.38%). Curing percentage and curcumin content of different cultivars varied due to genetic character of the cultivar. Anusuya (2004) recorded highest curcumin content in PTS-24, among different turmeric cultivars studied under North Karnataka condition.

From the present study, it can be concluded that the cultivars Salem, Rajapuri, Prathibha and CLT-325 are highly suitable for export as the curcumin content is present as prescribed the international standard.

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