

RESPONSE OF TURMERIC (*CURCUMA LONGA L*) TO NPK UNDER FOOTHILL CONDITIONS OF ARUNACHAL PRADESH

A.K Dubey and D.S Yadav

Division of Horticulture,
ICAR Research Complex for NEH Region
Umroi road, Umiam-793103

Arunachal Pradesh offers good scope for cultivation of turmeric. (*Curcuma Longa L.*). This crop is grown in a sizeable area in mid altitude of this state and plays a vital role in the economy of tribal farmers. Turmeric is monocotyledonous plant belongs to the family Zingiberaceae. It has been in continuous use since ancient time for its colouring, flavouring and digestive properties. Curcumin (di-cinamyl methane) is main constituent of the colouring. Indian Average productivity of turmeric is very low (30.9 q/ha) as compared to 70q/ha in Pakistan. Use of adequate quantity of manure and fertilizers plays a vital role in enhancing the productivity of turmeric. Since turmeric crop removes large amount of nutrients from soil, sufficient quantity of nutrients has to be applied to meet nutritional requirements and to obtain higher yields (Nagarajan and Pillai, 1979). Cultivar PCT-11 holds high yielding potentiality over varieties tried so far in Arunachal Pradesh. No works have so far done for fertilizers schedule for this variety in Arunachal Pradesh. The present study is therefore conducted to find out the optimum requirements of nutrient for better crop yield.

MATERIALS AND METHODS

An experiment was conducted on turmeric variety PCT-11 at ICAR Research Complex for NEH Region, Arunachal Pradesh centre, Basar during (1999-2000). The experiments comprised of three doses of nitrogen (90kg, 110kg and 130kg/ha) and two doses each of phosphorus (90kg and 110kg/ha) and potassium (70kg and 90kg/ha). The Experiment was laid out in randomized block design with three replications. Rhizomes of uniform size were planted at 40 x 15cm apart in April. Nitrogen and potash were applied in the form of urea and muriate of potash, respectively in three split doses i.e. at sowing, in June and in August. Phosphorus was applied in the form of single super phosphate at the time of sowing. A uniform dose of FYM was applied at the rate of 20t/ha in all plots. Uniform cultural operations including plant protection measures were provided to each plot. Harvesting was done in the Month of December.

RESULTS AND DISCUSSION

Significant effects of N, P and K on the entire yield contributing characters were observed (Table 1). An application of 130kg N+90kg P₂O₅+70kgK₂O produced significantly maximum height of the plant (135.77cm) followed by same dose of nitrogen, phosphorus and higher dose of potassium (120.07cm) which was at per

with other treatment combinations. However, the lowest plant height was recorded in plots receiving no fertilizers (81.33cm). Venkatesha et al (1998) also reported highest growth with higher doses of NPK in turmeric.

Plants receiving 130kgN+90kgP₂O₅+90kgK₂O had highest tillers per plant (6.20 tillers/plant) which did not have significant differences with combination of 130kgN+110kgP₂O₅+90kgK₂O/ha (5.80 tillers/plant), 110kgN+90kgP₂O₅+90kgK₂O (5.60 tillers/plant) and 90kg N+90kg P₂O₅+70kgK₂O (5.40tillers/plant). The lowest tillers/plant was found in control (3.23 tillers/plant). Gupta and Sengar, 1998 and Banafer and Tiwari, 1995 also reported significant effect of N and K respectively on growth and number of tillers in turmeric.

There was significant increase in weight of rhizome/plant under all treatment combinations over control. However, the highest rhizome weight was recorded with application of 130kgN+90kgP₂O₅+70kgK₂O/ha (355.80g) followed by 130kgN+90kgP₂O₅+90kgK₂O (330.90g) which was at par with 110kgN+110kgP₂O₅+90kgK₂O (315.10g) and 130kgN+110kgP₂O₅+70kgK₂O (308.50g) doses. Increased weight of rhizome was reported by application of N (Shashidhar and Sulikeri, 1996), P (Gupta *et al*, 1990) and K (Gupta and Sengar, 1998).

The diameter and length of finger were also influenced significantly by the application of fertilizers. An increase in diameter and length of finger were noticed under all treatment combinations over control. The diameter and length of finger were found to be highest with application of fertilizers at the rate of 130kg N+90kgP₂O₅+70kgK₂O. Pandey (1992) also found that yield parameters generally increased with increasing N application. Application of fertilizers improved yield significantly over control. Application of 130kgN+90kgP₂O₅+70kgK₂O/ha gave highest yield (350.60ql/ha) followed by a dose of 130kgN+90kgP₂O₅+90kgK₂O/ha (Table 2). The findings are in conformity with those reported by Muthuvel *et al* (1989) and Venkatesha and Khan (1997).

Based on the above results, it may be concluded that a fertilizer dose of 130kgN+90kgP₂O₅+70kgK₂O/ha is beneficial to get higher yield in turmeric.

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Table 1. Effect of NPK on vegetative growth of turmeric cv. PCT-11

Treatment	Plant height (cm)	Tillers/plant	Weight of rhizome (g)
N ₉₀ P ₉₀ K ₇₀	112.67	5.37	225.27
N ₉₀ P ₉₀ K ₉₀	117.70	5.10	210.47
N ₉₀ P ₁₁₀ K ₇₀	114.30	4.93	218.13
N ₉₀ P ₁₁₀ K ₉₀	119.37	4.50	215.40
N ₁₁₀ P ₉₀ K ₇₀	117.40	4.50	275.20
N ₁₁₀ P ₉₀ K ₉₀	108.57	5.60	298.70
N ₁₁₀ P ₁₁₀ K ₇₀	118.00	4.80	222.40
N ₁₁₀ P ₁₁₀ K ₉₀	114.50	4.87	315.10
N ₁₃₀ P ₉₀ K ₇₀	135.77	4.90	355.80
N ₁₃₀ P ₉₀ K ₉₀	120.07	6.20	320.90
N ₁₃₀ P ₁₁₀ K ₇₀	118.87	4.83	308.47
N ₁₃₀ P ₁₁₀ K ₉₀	117.23	5.83	220.70
Control	81.33	3.23	105.37
SE m ±	2.41	0.22	4.65
CD at 5%	7.03	0.64	13.57

Table-2. Effect of NPK on diameter, length and numbers of finger and yield of turmeric cv. PCT-11

Treatment	Diameter of finger (cm)	Length of finger (cm)	Finger /Plant	Yield/ha (q.)
N ₉₀ P ₉₀ K ₇₀	1.89	6.53	15.30	196.07
N ₉₀ P ₉₀ K ₉₀	1.93	6.67	13.77	190.93
N ₉₀ P ₁₁₀ K ₇₀	2.14	8.77	17.43	238.07
N ₉₀ P ₁₁₀ K ₉₀	2.28	8.37	16.73	214.87
N ₁₁₀ P ₉₀ K ₇₀	2.19	7.40	14.07	258.40
N ₁₁₀ P ₉₀ K ₉₀	2.35	9.53	18.40	275.90
N ₁₁₀ P ₁₁₀ K ₇₀	2.45	9.70	21.47	202.40
N ₁₁₀ P ₁₁₀ K ₉₀	2.52	8.60	23.50	296.50
N ₁₃₀ P ₉₀ K ₇₀	2.87	10.43	20.40	350.60
N ₁₃₀ P ₉₀ K ₉₀	2.55	9.65	19.93	312.70
N ₁₃₀ P ₁₁₀ K ₇₀	2.24	8.40	18.53	280.70
N ₁₃₀ P ₁₁₀ K ₉₀	2.05	9.50	16.03	245.40
Control	1.74	4.53	5.93	91.07
SE m ±	0.07	0.24	0.84	5.67
CD at 5%	0.21	0.70	2.45	16.55