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Short communication

Effect of fertigation on growth and yield of turmeric cv. Mydukur

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ABSTRACT

A field experiment was conducted at Horticultural Research Station, Anantharajupet, to study the effect of fertigation on growth and yield of turmeric to standardize the quantum of fertilizers to be given through fertigation for improving the productivity of turmeric. This experiment was carried out in a randomized block design with 4 replications. The treatments consisted of T1 (100% RDF through drip), T2 (75% RDF through drip), T3 (50 % RDF through drip), T4 (100 % RDF through soil and drip irrigation) and control (100 % RDF through soil and conventional irrigation). RDF, i.e., recommended dose of fertilizers comprised of 180 Kg N, 60 Kg P2 O5 and 120 Kg K2O ha^{-1}. In the case of T1-T3, N and K alone was applied through drip, while, phosphorus was applied as basal dose. Data of three seasons showed that, there was significant difference between farmers' practice and fertigation treatments and it was observed that the treatment in which 100% fertilizers was applied through drip recorded the maximum plant height (99.36 cm), number of tillers per plant (3.41) and fresh rhizome yield (12.24 t acre^{-1}) this was on par with the treatment in which 75% fertilizers were applied through drip. The B:C ratio was highest (1.49) in plants supplied with 75% RDF through drip. This shows that, fertigation with 75% RDF through drip in turmeric is profitable.

Key words: Fertigation, turmeric, growth, yield

Spices are high-value export oriented crops, which play an important role in agricultural economy of the country. Among the spices turmeric is one of the most important and popular spice and also a traditional item of export. It is grown extensively in Andhra Pradesh. Turmeric is a nutrient loving plant and removes large amount of nutrients from soil, so sufficient quantities of nutrients have to be applied in order to meet its nutritional requirements and to obtain higher yields (Dubey and Singh, 2004). Drip irrigation system is a very efficient method of supplying water to plant (Banker *et al*, 1993). Fertigation through drip irrigation facilitates precise application of fertilizers, as it delivers nutrients to the roots where it can be effectively utilized and results in greater uptake and nutrient use efficiency (Elfving, 1982). Though turmeric is grown on a commercial scale the information on effect of fertigation in turmeric is lacking. Hence attempts were made in the present investigation to find out the effect of fertigation levels on growth and yield of turmeric cv Mydukur.

The present investigation was carried out at Horticultural Research Station, Anantharajupet. The experiment was laid out in a randomized block design with 4 replications. The details of the treatments are given below.

T1 -100% recommended dose of N & K through drip

T2 -75% recommended dose of N & K through drip

T3 - 50% recommended dose of N & K through drip

T4 - 100% recommended dose of N & K through soil and irrigation by drip

T5 -100% recommended dose of N & K through soil and conventional irrigation

Recommended dose of fertilizer (RDF) comprised of 180 Kg N, 60 Kg P2 O5 and 120 Kg K2O ha^{-1}. In the case of T1-T3, N and K in the form of urea and muriate of potash alone was applied through drip while phosphorus in the form of single super phosphate was applied to soil as basal application. In T4 and T5 fertilizers were applied to soil in split doses. T4 was given drip irrigation and T5 was given conventional irrigation. Inline drippers with a discharge rate of 4 l hr^{-1} was followed for all the plants spaced at 30x 15cm. Irrigation was given daily except on rainy days. Conventional irrigation was given to T5 once in a week. The scheduling interval of fertigation was followed at weekly

Table 1. Effect of fertigation on growth and yield characters in turmeric cv. Mydukur

Treatment	Plant height(cm)				No of tillers per plant				Yield (t acre^{-1})				B:C
	2005-06	06-07	07-08	Mean	2005-06	06-07	07-08	Mean	2005-06	06-07	07-08	Mean	ratio
T1 (100% recommended dose of N & K through drip)	100.1	99.98	98.00	99.36	3.28	3.88	3.38	3.51	13.23	11.88	10.72	12.24	1.38
T2 (75% recommended dose of N & K through drip)	98.63	97.13	90.95	95.57	2.95	3.60	3.30	3.28	11.71	11.60	10.73	11.57	1.49
T3 (50% recommended dose of N & K through drip)	98.05	95.23	82.80	92.03	2.60	2.71	2.70	2.67	10.03	10.56	9.64	10.34	1.36
T4 (100% recommended dose of N & K through soil and irrigation by drip)	94.63	96.13	78.30	89.69	2.35	2.83	2.50	2.56	10.36	10.85	10.31	10.57	1.05
T5 (100% recommended dose of N & K through soil and conventional irrigation)	93.30	89.05	71.50	84.62	1.88	1.95	1.75	1.86	8.47	10.09	8.96	9.22	0.72
SEm±	1.02	1.25	1.51		0.19	0.11	0.10		0.52	0.07	0.13		
CD (*P=0.05*)	3.13	3.84	4.65		0.60	0.34	0.33		1.60	0.24	0.39		

intervals for 13 weeks starting from 5th to 17th week after planting in the field. Observations on morphological characters and yield were recorded and presented in the table 1.

A perusal of data presented in Table 1 showed that plant height was significantly more in the treatments provided with fertigation. This might be due to enhanced growth under high water levels because of better turgidity of cells, leading to cell enlargement and better cell wall development (Madhumathi *et al*, 2004). However, the lowest plant height was recorded in treatments provided with conventional method of fertilizer application and irrigation.

Data pertaining to number of tillers per plant also showed significant difference between fertigated and non fertigated plants. The highest number of tillers per plant (3.51) was recorded with application of 100% recommended dose of N and K through drip. Sashidhar *et al* (1997) reported that high N was beneficial for all vegetative characters. Better uptake of nutrients in drip irrigated plants ensures photosynthetic efficiency, thereby causing greater synthesis, translocation and accumulation of carbohydrates (Ghanta *et al,* 1995).

Data on fresh rhizome yield presented in Table 1 revealed that yield registered a maximum in fertigated compared to conventional methods. Though yield per plant was higher in T1 (100% recommended dose of N and K through drip), and in T2 (75% recommended dose of N and K through drip).

Significant difference in growth and yield between fertigated plants and plants under conventional irrigation might be due to constant and continuous supply of water and nutrients in soluble form to wetted area of the root zone, ensuring better availability of nutrients (Mahalakshmi *et al,* 2001). However, low yields were recorded in treatments in which fertilizer application and irrigation were conventional. This might be due to loss of added nutrients through run-off, leaching and other factors.

A comparison of morphological and yield characters reveals that application of N and K at 100% and 75% recommended dose of fertilizers through drip resulted in significantly higher yield compared to 50% or full soil application. Accordingly, the benefit:cost ratio was highest (1.49) in plants supplied with 75% recommended dose of fertilizer through fertigation. Hence, fertigation with 75% recommended dose of fertilizer is profitable.

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