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Effect of Application Different Organic Growth Promoters On Growth of Leafy Vegetables Under Parbhani Conditions

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ABSTRACT
Present investigation on was undertaken at the Instructional-Cum-Research-Farm, College of Horticulture, V.N.M.K.V., Parbhani, during Kharif 2017. The experiment was laid out in Randomized Block Design with seven treatments replicated thrice. The growth parameters viz. maximum plant height of Amaranthus (38.77 cm), Methi (18.03 cm) and Palak (23.17), number of leaves per plant of Amaranthus (19.87), Methi (24.63) and Palak (10.27), number of branches of Amaranthus (8.00), Methi (7.90) and Palak (2.17), leaf area of Amaranthus (33.20 cm²), Methi (4.07 cm²) and Palak (44.87 cm²) and minimum days for maturity of Amaranthus (32 days), Methi (28.33 days) and Palak (27 days) were recorded with the treatment of soil application of RDF + vermiwash 5% + panchgavya 3% + humic acid 0.2% + cow urine 5% + amritpani 3% (T_7).
Keywords: *Amaranthus, Methi, Palak, organic growth promoters*

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INTRODUCTION

Leafy vegetables are important items of commerce and thus can play a major role in the economic development. During the recent years, the interest in leafy vegetable production has increased rapidly as a result of greater appreciation towards their food value. Leafy vegetables are high yielding and provide nutritional security, more employment, more cash and foreign exchange [3]. During the year 2016-2017 the India was second largest producer of vegetables in the world next after china with an estimated production about 163.86 million tonnes from an area of 9.39 million hectare and productivity is 17.3 metric tonnes per hectare. India contributing 15 per cent of the world production of vegetable crops [1]. In present agricultural system poses a great threat to the sustainability of our agro-eco-system under such situation it is essential to look for alternatives which are effective and eco-friendly. During recent years organic farming system is gaining lot of importance on account of hazardous effects of chemical farming system. So, organic manures, bio-pesticides, bio-fertilizers and bio-growth promoter must be used either alone or in judicious combination to maintain the ecological balance. The use of vermiwash, panchgavya, humic acid, cow urine and amritpani is becoming popular in farming system in general and vegetables in particular. In this context the exact scientific information on specific organic liquid organic manure to be used, stage of application and its concentration and its utility in increasing the growth parameters of vegetables is lacking. Hence, the present investigation is planned to study the effect of different organic growth promoters on growth of leafy vegetables.

MATERIAL AND METHODS

The experiment was laid out in randomized block design (RBD) with seven treatments replicated thrice. The varieties used for the experimentation was Amaranthus (Green leaves), Palak (All green) and for Methi (Local) was selected for study. The trail framed was intended to study the effect of vermiwash, panchgavya, humic acid, cow urine, amritpani combined with RDF alone and in combinations with different organic growth promoters on growth, yield and quality of leafy vegetables. The experiment consists of seven treatments vigriously, RDF (80:40:40 NPK kg/ha) (T_1), Vermiwash @ 5% (T_2),

Panchgavya @ 3% (T_3), Humic acid @ 0.2% (T_4), Cow urine @ 5% (T_5), Amritpani @ 3% (T_6) and soil application of RDF + Vermiwash 5% + Panchgavya 3% + Humic acid 0.2% + Cow urine 5% + Amritpani 3% (T_7). The recommended dose of fertilizers 80:40:40 NPK kg/ha was applied to the plots of treatments T_1 and T_7 of which 40 N kg/ha and full dose of P_2O_5 and K_2O was applied just before sowing, while, remaining 40 N kg/ha was given 15 days after sowing. The foliar application of organic growth promoters as per treatments was done at 15 and 21 days after sowing. The results obtained in respect of growth of leafy vegetables influenced due to different treatments of organic growth promoters are summarized as below.

RESULT AND DISCUSSION

The results of the present investigation presented in Table 1 showed that, all growth parameters like height of plant, number of leaves per plant, number of branches of plant, leaf area and days required for horticultural maturity showed significant differences at 30 days after sowing among the different treatments studied. The maximum values plant height at 30 DAS in Amaranthus (38.77 cm) was observed with the application of RDF + vermiwash 5% + panchgavya 3% + humic acid 0.2% + cow urine 5% + amritpani 3% (T_7) and it was at par with rest of treatments except application of amritpani 3% (T_6). In Methi (18.03 cm) was recorded with the application of RDF + vermiwash 5% + panchgavya 3% + humic acid 0.2% + cow urine 5% + amritpani 3% (T_7) and it was at par with treatments RDF (T_1), humic acid 0.2% (T_4) vermiwash 5% (T_2) and panchgavya (T_3) and in Palak (23.17 cm)) was obtained in treatment application of RDF + vermiwash 5% + panchgavya 3% + humic acid 0.2% + cow urine 5% + amritpani 3% (T_7) and it was at par with RDF (T_1). At 30 DAS maximum number of leaves in Amaranthus (19.87) were obtained with the treatment of soil application of RDF + foliar spray of vermiwash 5% + panchgavya 3% + humic acid 0.2% + cow urine 5% + amritpani 3% (T_7), and it was statistically at par with the RDF treatment (T_1) in Methi (24.63) was obtained in treatment of soil application of RDF + foliar spray of vermiwash 5% + panchgavya 3% + humic acid 0.2% + cow urine 5% + amritpani 3% (T_7) and it was at par with treatments RDF (T_1), humic acid 0.2% (T_4) and vermiwash 5% (T_2) and in Palak (10.27) were observed in treatment of soil application of RDF + foliar spray of vermiwash 5% + panchgavya 3% + humic acid 0.2% + cow urine 5% + amritpani 3% (T_7) and it was followed by treatment RDF (T_1). These results may be due to availability of more nutrients through inorganics as well as organic growth promoters in general and panchgavya in particular. The increased absorption of nutrients through foliar application of organic growth promoters might have resulted in increased synthesis of carbohydrates, proteins and fats which are utilized in building up of new cells. Similar trend of results has been reported by Panda *et al*., [4]in amaranthus.

At 30 DAS the maximum (8.00) number of branches in Amaranthus were observed in the treatment of soil application of RDF + foliar spray of vermiwash 5% + panchgavya 3% + humic acid 0.2% + cow urine 5% + amritpani 3% (T_7) and it was statistically at par with rest of treatments except application of amritpani 5% in Methi (7.90) were recorded in treatment of soil application of RDF + foliar spray of vermiwash 5% + panchgavya 3% + humic acid 0.2% + cow urine 5% + amritpani 3% (T_7), and it was at par with treatments RDF (T_1), humic acid 0.2% (T_4) and vermiwash (T_2) and in Palak (2.17) were observed in treatment of soil application of RDF + foliar spray of vermiwash 5% + panchgavya 3% + humic acid 0.2% + cow urine 5% + amritpani 3% (T_7), and it was followed by RDF treatment (T_1). The higher values of number of branches observed in the treatments of application of RDF plus organic growth promoters could be attributed to the effect of inorganic nutrients and combined effect of organic growth promoters in general and panchagavya in particular as increases number of branches might be due to the effect of enzymes and auxins present in panchagavya which might have favoured rapid cell division and multiplication [5].

The maximum leaf area (33.20 cm^2) in Amaranthus was recorded in the treatment of soil application of RDF + foliar spray of vermiwash 5% + panchgavya 3% + humic acid 0.2% + cow urine 5% + amritpani 3% (T_7) and it was statistically at par with treatments RDF (T_1) and humic acid 0.2% (T_4), in Methi (4.07 cm^2) with the treatment of soil application of RDF + foliar spray of vermiwash 5% + panchgavya 3% + humic acid 0.2% + cow urine 5% + amritpani 3% (T_7), and it was at par with RDF treatment (T_1) and in Palak (44.87 cm^2) was recorded in treatment of soil application of RDF + foliar spray of vermiwash 5% + panchgavya 3% + humic acid 0.2% + cow urine 5% + amritpani 3% (T_7), and it was followed by RDF treatment (T_1). [5]. Rapid increase in cell division and cell elongation in the meristmatic region were found in plants sprayed, with humic acid resulted in improving plant growth [2], which supports the results of the present findings.

Table 1 : Influence of plant growth promoters on growth parameters of leafy vegetables

Sr. No.	Treatments	Growth parameters																			
		Plant height (cm) at 30 DAS			Number of leaves at 30 DAS			No. of branches at 30 DAS			Leaf area (cm^2) at 30 DAS			Horticultural maturity (Days)							
		Amaranthus	Methi	Palak	Amaranthus	Methi	Palak	Amaranthus	Methi	Palak	Amaranthus	Methi	Palak	Amaranthus	Methi	Palak					
T_1	RDF (80:40:40 NPK Kg/ha)	36.27	16.08	23.14	18.33	23.33	8.80	7.93	7.87	1.83	31.63	3.80	39.90	28.33	28.33	28.33					
T_2	Vermiwash 5%	34.64	15.10	18.09	14.80	21.23	6.94	7.53	7.20	1.16	29.00	3.20	32.23	31.00	31.00	31.33					
T_3	Panchagavya 3%	34.07	15.01	17.98	14.73	20.00	6.93	7.40	6.13	1.01	26.60	3.00	30.00	31.00	34.00	32.33					
T_4	Humic acid 0.2%	34.81	15.28	18.34	15.20	22.40	7.40	7.60	7.33	1.22	30.93	3.50	34.40	30.00	33.33	30.67					
T_5	Cow urine 5%	33.72	14.75	17.62	14.73	19.93	6.80	7.00	5.57	0.87	25.53	2.90	28.97	32.33	35.67	31.67					
T_6	Amritpani 3%	32.05	14.25	15.21	13.67	18.50	6.60	6.70	5.40	0.80	19.80	2.55	28.30	32.67	36.00	33.00					
T_7	RDF + T_2 to T_6	38.77	18.03	23.17	19.87	24.63	10.27	8.00	7.90	2.17	33.20	4.07	44.87	28.33	32.00	27.00					
	S.E. ±	**1.72**	**0.90**	**0.96**	**0.67**	**1.16**	**0.41**	**0.36**	**0.44**	**0.29**	**1.17**	**0.14**	**1.54**	**1.40**	**1.28**	**1.65**					
	C.D. at 5%	**5.32**	**2.78**	**2.97**	**2.08**	**3.57**	**1.27**	**1.11**	**1.35**	**0.89**	**3.60**	**0.44**	**4.77**	**4.32**	**3.95**	**5.11**					

The minimum number of days in Amaranthus (32.00 days), Methi (28.33 days) and Palak (27.00 days) were required for maturity with the soil application of RDF + foliar spray of vermiwash 5% + panchgavya 3% + humic acid 0.2% + cow urine 5% + amritpani 3% (T_7) and maximum days in Amaranthus (36 days), Methi (32.67 days) and Palak (33 days) required for maturity with application of amritpani 3%. This could be attributed to the combined effect of inorganic nutrients and organic growth promoters. The required quantities of nutrients and growth hormones might have made available to the plants at proper stage of growth and development which might have resulted in having better nutritional status of the plant, which was favoured by this treatment [6].

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