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RESEARCH ARTICLE

STUDY THE DIFFERENT LEVELS OF VERMICOMPOST APPLICATION IN FENUGREEK (*TRIGONELLA FOENUM-GRAECUM* L.) CV. LOCAL

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ABSTRACT

A field experiment was conducted at ASPEE, ARDF, Tansa Farm during *rabi* season of 2013-14 for evaluating the effect of different levels of vermicompost application on growth and yield of fenugreek cv. Local. Five treatments comprising of various levels of vermicompost *viz.*, T_0 -Control (100 % RDF), T_1- (T_0 + 2 tonnes vermicompost), T_2- (T_0 + 3 tonnes vermicompost), T_3- (T_0 + 4 tonnes vermicompost) and T_4- (T_0 + 5 tonnes vermicompost) were evaluated on fenugreek cv. Local. The highest values for all the parameters like plant height (46.62 cm), root length (17.52 cm), number of branches (7.20), no. of pods plant^{-1} (54.40), seed yield (0.42 kg; 14000 kg) and straw yield (0.97 kg; 3234.66 kg) plot^{-1} and ha^{-1}, respectively, were recorded in T_4 treatment (T_0 + 5 tonnes vermicompost) which had significantly recorded superior out of all treatments. From the economic point of view, this treatment had maximum net realization of Rs. 42,687 and cost benefit ratio 1:1.90 ha^{-1}. It can be concluded that vermicompost proves be an effective fertilizer.

INTRODUCTION

Fenugreek (*Trigonella foenum-graecum* L.) commonly known as *Methi,* belongs to the family Fabaceae (leguminosae) and has originated in South East Europe or the South West Asian region. The role of organic manures develops a sustainable agricultural system by maintaining soil fertility, soil physical properties, ecological balance and providing stability to the production without polluting soil, water and air. A judicious combination of chemical fertilizers, organic manures and biofertilizer should be formulated for crops and cropping system within the ecological, social and economic possibilities. The castings contain high amounts of nitrogen, potassium, phosphorus, calcium, and magnesium. Castings contain 5 times the available nitrogen, 7 times the available potash, and 1 ½ times more calcium than found in good top soil. The content of the earthworm castings, along with the natural tillage by the worms burrowing action, enhances the permeability of water in the soil. Worm castings can hold close to nine times their weight in water. "Vermiconversion," or using earthworms to convert waste into soil additives, has been done on a relatively small scale for some time.

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MATERIALS AND METHODS

The present study was carried out at ASPEE, Agricultural Research Development Foundation (ARDF), Tansa Farm during *rabi* 2013-14. The experiment was laid out in randomized block design (RBD) with five replications. The recommended dose of RDF is 20:40:00 kg ha^{-1}. The seeds were sowed at 15 x 10 cm distance in a plot size 3 x 1 m. All agronomical practices in virgue were employed time to time. The statistical analysis was done by using method of Panse and Sukhatne, (1967).

RESULTS AND DISCUSSION

The present experiment was undertaken to study the impacts of vermicompost application on growth and yield of *rabi* fenugreek cv. Local. The data clearly showed that the growth and yield of crops obtained with treatment T_4 had showed significantly higher plant height (46.62 cm), root length (17.52 cm), number of branches (7.20), no. of pods plant^{-1} (54.40), seed yield (0.42 kg; 14000 kg plot^{-1} and ha^{-1}) and straw yield (0.97 kg; 3234.66 kg plot^{-1} and ha^{-1}), respectively in Table 1. From the economic point of view, this treatment had maximum net realization of Rs. 42,687 and cost benefit ratio 1:1.90 ha^{-1} in Table 2. The good effect of vermicompost on seed and straw

Table 1. Effect of different levels of vermicompost application on growth and yield of Fenugeek cv. Local

Treatment Details	Plant height, cm	Root length, cm	No. of branches plant^{-1}	Total no. of pods plant^{-1}	Seed weight plot^{-1}, kg	Straw weight plot^{-1}, kg	Seed weight ha^{-1}, kg	Straw weight ha^{-1}, kg	Harvest Index, %
	1	2	3	4	5	6	7	8	9
T_0	36.36	10.47	3.48	35.52	0.22	0.65	750.66	2189.33	25.51
T_1	38.36	13.47	4.36	42.28	0.28	0.85	930.66	2854.22	24.55
T_2	41.40	14.88	5.36	46.24	0.32	0.88	1076.53	2941.33	26.68
T_3	43.31	16.52	6.56	50.96	0.36	0.93	1198.66	3120.00	27.67
T_4	46.62	17.52	7.20	54.40	0.42	0.97	1400.00	3234.66	30.08
C. D. @ 0.05	0.40	0.35	0.35	0.98	0.01	0.003	58.29	29.25	1.21

Table 2. Effect of different levels of vermicompost application on treatments economics

Treatments	Cost of production, Rs. ha^{-1}	Total Gross Realization, Rs. ha^{-1}	Net Realizations, Rs. ha^{-1}	C:B:R
	10	11	12	13
T_0	12000	31533	19533	1:1.63
T_1	16200	43556	27356	1:1.69
T_2	18300	49427	31127	1:1.70
T_3	20400	55627	35227	1:1.73
T_4	22500	65187	42687	1:1.90

yield due to the combined application inorganic fertilizer and organic fertilizer which increased nutrients availability resulting in vigorous plant growth by production of organic acids increased root growth through better root development. Earthworms rapidly convert the waste into humus like substances with finer structure than thermophilic composts (Atiyeh *et al.,* 2000). The results are in accordance with the findings reported by Jain and Trivedi (2005) in soybean, Patel *et al*. (2010), Dubey *et al.* (2011) and Dubey *et al*. (2012) in fenugreek and Darzi and Sayedhadi (2012) in Dill with respect to plant height and number of branches. The similar results were reported by Parakhia *et al*. (2000) in fenugreek, Kachot *et al*. (2001) in groundnut.

Conclusion

The plant height (cm), root length (cm), number of branches plant^{-1}, total number of pods plant^{-1}, seed yield (kg plot^{-1} and kg ha^{-1}), straw yield (kg plot^{-1} and kg ha^{-1}), harvest index and cost benefit ratio were increased significantly with application vermicompost at levels from 2 t./ha to 5 t./ha and fertilizing it with 20: 40: 00 NPK kg ha^{-1} as compared to control.

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