



EFFECT OF VERMICOMPOST ON GROWTH PARAMETERS OF *LYCOPERSICON ESCULENTUM* AND NPK LEVEL OF AMENDED SOIL

Eswaran. N and Mariselvi,S

Department of Zoology Nallamuthu Gounder Mahalingam College, Pollachi

ARTICLE INFO	ABSTRACT
Received 15th, June, 2016, Received in revised form 18 th, July, 2016, Accepted 16th, August, 2016, Published online 28th, September, 2016	This study was conducted to evaluate the effect of vermicompost and organic fertilizers on growth, yield parameters of tomato plant as well as NPK levels on control garden soil and vermicompost. Various growth and yield parameters like seed germination, length, plant height, yield/plant, marketable yield/plant, mean leaf number, total plant biomass were recorded. Almost all the growth, yield and quality parameters increased significantly as compared to control, though the increase within the treatments was not found to be significant. The present study suggested that vermicompost is more favorable for vigorous production of tomatoes. The vermicompost can be economically and environmentally suitable and also maintenance of soil environment. Vermicompost is rich in NPK, micronutrients, beneficial soil microbes and also contain 'plant growth hormones & enzymes'. Similarly, the vermicompost prepared from cow dung had the highest total nitrogen (N) content (275%) phosphorus (12.70 mg/g) and total potassium (11.44 mg/g). Reduced use of 'water for irrigation' as application of vermicompost over successive years improved the 'moisture holding capacity' of the soil.
Keywords: Vermicompost, Growth, yield, Tomato, NPK	

Copyright © 2016 Eswaran. N and Mariselvi,S., This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

INTRODUCTION

Increasing population in most of the Asian countries, the major challenge facing the mankind during the beginning of the new millennium is to provide food substance for all the people of this continent. However, sustaining the food production from these decreasing land areas depends largely on one factor, maintenance of soil health at high levels for encouraging good growth of plants. Due to adverse effects of chemical fertilizers, interest has been stimulated for the use of organic manures (Follet *et al.*,1981). The best alternative of the present day's environmental desperation is to make proper use of the available unutilized organic biodegradable wastes in order to convert them in to compost within a short period (Edwards, 1998).

One of the unique features of vermicompost is that during the process of conversion of various organic wastes by earthworms, many of the nutrients are changed to their available forms in order to make them easily utilizable by plants. The present work has been under take to evaluate comparative efficacies of vermicompost developed by indigenous method on tomato plants. This research work is to evaluate the impact of vermicompost and organic manures on tomato plant height, number of leaves, length and breadth, weight of fruits, number of fruits and nutrient levels (Nitrogen, Phosphorus and Potassium) in amended soil. Sustainability in

agriculture refers to the capacity to remain productive while maintaining the soil fertility but without effecting soil biodiversity. Manure and biologically active preparations of animal and plant origin are most commonly used for sustainable production (Premsekhar and Rajashree, 2009) due to their beneficial effects on nutrient uptake and retention, pest control and productivity (Barrios - Masias *et al.*, 2011).

MATERIALS AND METHODS

Preparation of vermicompost

Leaf litter was collected periodically from the Coimbatore and kept in large plastic container. Compost mixture was prepared in round plastic container, sprinkled with water to maintain moisture content and was allowed for pre-digestion. After of pre-digestion mixture was transferred to the plastic container and the epigenic earthworms, *Eudrilus eugeniae* (kinberg) were introduced. At the end of vermicomposting, the vermicompost were spread separately and worms were handpicked and isolated. The vermicompost is used for growth medium for different treatments.

Measurement of growth parameters

The day sowing was taken as the first day and the treatment set up were observed for germination in every day. The total number of seeds germinated on each day was counted and recorded.

*✉ Corresponding author: Eswaran. N

Table 1 Growth and yield parameters of *L. esculentum*

Treatment	Seed germination		Seed length		Shoot length		Root length		No. of leaves	
	Organic manure	Vermi compost	Organic manure	Vermi compost	Organic manure	Vermi compost	Organic manure	Vermi compost	Organic manure	Vermi compost
Control soil	73.50±1.91	73.50±1.67	9.34±0.025	9.34±0.025	27.35±0.85	27.35±0.85	4.74±0.23	4.47±0.23	32.50±0.72	32.50±0.72
25%	79.38±1.85	83.45±1.37	9.98±0.028	13.17±0.036	28.38±1.35	30.35±1.39	4.93±0.31	5.13±0.38	47.00±0.56	53.00±0.86
50%	83.45±1.34	91.35±1.23	11.02±0.034	15.38±0.056	33.78±1.47	47.48±1.48	6.38±0.39	7.83±0.48	68.62±0.83	77.32±0.91
75%	89.35±1.09	97.00±1.02	13.12±0.065	17.35±0.079	43.48±1.59	54.68±1.67	7.82±0.59	10.13±0.79	70.55±0.89	82.41±0.98
100%	90.10±0.86	99.80±0.58	15.67±0.074	19.73±0.098	53.63±1.82	62.78±1.98	9.83±0.78	14.13±1.03	79.47±0.94	111.2±1.04
LSD 5%	3.47	2.89	1.86	2.54	2.38	2.89	1.89	2.05	1.98	2.02

Table 2 NPK level in garden soil and vermicompost

Treatment	Organic manure			Vermicompost			
	Initial	Final	Increase	Initial	Final	Increase	
Nitrogen	Control soil	0.017±0.001	0.024±0.001	0.007	0.017±0.001	0.024±0.001	0.007
	25%	0.084±0.001	0.103±0.001	0.019	0.225±0.001	0.298±0.001	0.073
	50%	0.134±0.001	0.162±0.002	0.028	0.473±0.001	0.570±0.001	0.097
	75%	0.195±0.002	0.241±0.001	0.046	0.580±0.001	0.699±0.001	0.119
	100%	0.278±0.001	0.342±0.001	0.064	0.618±0.001	0.743±0.001	0.125
	LSD 5%	0.004	0.003	0.002	0.002	0.003	0.003
Phosphorus	Control soil	0.017±0.001	0.024±0.001	0.007	0.017±0.001	0.024±0.001	0.007
	25%	0.023±0.002	0.032±0.001	0.009	0.225±0.001	0.298±0.002	0.073
	50%	0.029±0.001	0.041±0.002	0.012	0.473±0.002	0.570±0.001	0.097
	75%	0.043±0.001	0.057±0.001	0.014	0.580±0.001	0.699±0.001	0.119
	100%	0.048±0.001	0.064±0.001	0.016	0.618±0.002	0.743±0.001	0.125
	LSD 5%	0.003	0.002	0.002	0.002	0.003	0.003
Potassium	Control soil	0.013±0.001	0.019±0.001	0.006	0.013±0.001	0.019±0.001	0.006
	25%	0.015±0.001	0.028±0.001	0.013	0.023±0.001	0.054±0.001	0.031
	50%	0.020±0.002	0.038±0.001	0.017	0.073±0.001	0.136±0.001	0.063
	75%	0.025±0.001	0.048±0.001	0.023	0.108±0.002	0.206±0.002	0.098
	100%	0.032±0.001	0.060±0.002	0.028	0.136±0.001	0.242±0.001	0.106
	LSD 5%	0.003	0.002	0.003	0.003	0.005	0.005

Values are mean ± SD of three replicates

Means followed by a common superscript are not significant at 5% level by using DMRT

At the end of the 30 days after sowing, the length of seedling was measured and the average length was calculated and represented in cm. The length of the shoot from the base to the tip of the shoot was measured using the centimeter scale and the mean length was expressed in cm. The root length of the root was measured and its expressed in cm. The total number of leaves and fruits in the plants were counted and recorded.

Estimation of N, P and K

Sample was taken and analysed volumetrically for nitrogen, phosphorous and potassium.

RESULTS

A study have been carried out to analyse the effect of organic manure and vermicompost on vegetable crop Tomato. The percentage of seed germination, seedling length, growth parameters like shoot length, root length, number of leaves per plant, leaf area, yield parameter like number of fruits per plant and weight of fruits are showed in Table 1. The NPK level values were tabulated in Table2.

CONCLUSION

The present study concluded with all the growth and yield parameters of *L.esculentum* plants grown in soil treated with vermicompost in increased compared to other treatments significantly. The effect of organic manure and vermicompost on the nutrient levels (Nitrogen, Phosphorus and Potassium) in amended soil was increased.

Acknowledgement

Most heartly and with deep sense of love, I express my gratitude to my parents, guide family members and technical assistants and all for their blessings, and everlasting encouragement for acquitting my M.Phil dissertation.

References

1. **Barrios-Masias, F. H., Cantwell, M. I., Jackson, L. E.** (2011). Cultivar mixtures of processing tomato in an organic agroecosystem. *Organic Agriculture*, 1, 17-30.
2. **Edwards CA** (1988). Use of earthworms in breadown and managemet of organicwastes.In:Edwards .C.A.(Ed.) Earthworm ecology.CRC Press LLC, Boca Raton, Florida,pp.327-354.)
3. **Follet, R.,R. Donahue and L.Murphy,**(1981). Soil and Soil Amendments. Prentice hall : Inc., New jersey.
4. **Premsekhar.M., & Rajashree, V.** (2009). Influence of Organic Manures on Growth, Yield and Quality of Okra. *American-Eurasian Journal of Sustainable Agriculture*, 3(1), 6-8.