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COMPARATIVE EFFECT OF VERMICOMPOST AND NPK ON SOLANUM *LYCOPERSICUM* PLANT GROWTH

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Abstract: The aim of the present study was to investigate the suitability for vermicomposting of vegetable waste amended with cow dung using the earthworm species *Eisenia foetida*. Moreover, the effect of different vermicompost on tomato plants in pot culture experiment was also investigated. In present 1:1 ratio (cow dung: vegetable waste) of substrates used in vermicomposting shows minimum mortality of earthworms. It was also observed that vegetable waste amended with cattle manure in appropriate ratio produces ideal compost which could have attributed to the plant growth as well as fecundity of earthworms.

Key words **- Vermicomposting, Vermiwash, Chemical analysis, *Eisenia foetida*, *Solanum lycopersicum*.**

I. INTRODUCTION

Modern agricultural practices mostly trust on high inputs of mineral fertilizers to achieve high crop yield so it includes applications of chemical fertilizers for high yield and chemical pesticides to protect crops against pathogens and pests. Consequence of excessive use of chemical fertilizers lead to soil pollution, water pollution and ultimately environmental pollution. The role of earthworms in soil formation and soil fertility is well recognized and documented in various researchers (B. Jeberlin Prabina et. al. 2018). An approach towards good soil management with efforts on the role of soil inhabitants like earthworms and microorganisms in soil fertility is very important in maintaining the ecosystem. Use of vermicompost, favourably affects soil pH, microbial population and soil enzyme activities (Shweta and Singh, 2006). There are three top ways in solid waste management; these are Reduce, Reuse and Recycle. Vermicomposting technology is an effective and time saving process for recycling college campus solid waste (Giramkar, 2019). The gut of earthworms in vermicomposting acts as bioreactor and releases vermicasts (Ansari, A. et. al. 2010). This paper emphasizes on the effect of vermicompost on Solanum lycopersicum plant growth.

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II. MATERRIAL AND METHODS

College campus organic wastes containing canteen waste, paper waste and garden waste) were collected and were exposed to sunlight for 4 to 7 days to remove the various harmful organisms and toxic gases from waste (Bhatnagar and Paitta, 1996). Sun dried waste was layered in a vermicomposting bed (Giramkar, 2019). Eartworm species *Eisenia foetida* (Image-1) was collected from authorised vermiculture center and used for vermicomposting. Vermicomposting bed was prepared and vermicompost was harvested. Vermiwash was prepared using initial feed mixture and final vermicompost. Physio-chemical properties of vermiwash was analysed. Comparative effect of vermicompost and Sikko Water Soluble NPK Fertilizer (19:19:19) on *Solanum Lycopersicum* was observed. Plantlets of *Solanum Lycopersicum* were planted in three different pots and vermicompost and NPK fertilizer was added to two of the pots every 15 days while the controlled plant was watered daily. The plants were observed daily and readings were reported in the parameters of plant height, number of leaves, plant growth and fruit quality and quantity. An auxanometer was used to measure plant height.

Image-1: Earthworm species used in present study

III. RESULT AND DISCUSSION

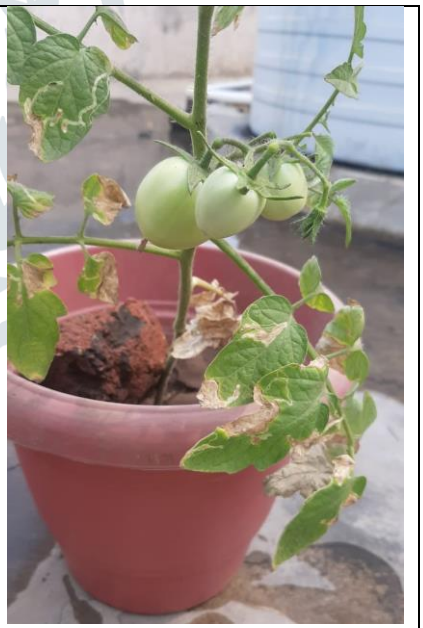
Effect of vermicompost and NPK on *Solanum Lycopersicum* plant height was observed in present study. Vermicompost and NPK were given to experimental pots containg *Solanum Lycopersicum* plants for 40 days. Controlled pots containg *Solanum Lycopersicum* plants were watered instead of fertilizers. Plant growth was recorded regularly. Observations are noted in below table.

Observation table-1:

No. of Days	**Controlled** (Average height in cm)	**NPK** (Average height in cm)	**Vermicompost** (Average height in cm)
Day 15	16 ± 2	13 ± 2	14 ± 2
Day 20	32 ± 3	26 ± 2	25.5 ± 2
Day 25	45 ± 3	38.5 ± 3	38 ± 2
Day 30	60 ± 4	52 ± 3	53 ± 2
Day 35	70 ± 4	61 ± 4	61 ± 2
Day 40	82 ± 3	72 ± 4	73 ± 2

Control

Effect of NPK



Effect of vermicompost

Plate-2: Comparative effect of vermicompost and NPK on *Solanum Lycopersicum* plant growth

IV. CONCLUSION

Vermicomposting technology played a vital role in the decomposition of waste material and brought the efficient nutrient recycling and enhanced plants growth. The study reveals that the good quality of bio-fertilizer was obtained from vermicompost bed. Vermicomposting is an effective method of recycling the biodegradable waste produced at home.

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