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ORIGINAL ARTICLE

Impact of Vermicompost Prepared From Organic Waste (Kitchen Wastes, Flower and Green Waste) on Yield of Tomato Crop in Aligarh Region, Uttar Pradesh

Arti Mittal[1], Neetu Singh[1] and Virendra Kumar[2]
[1] Department of Zoology, J.J.T. University, Jhunjhunu (Rajasthan)
[2] Department of Zoology, D.S. Degree College Aligarh
Email: arti.mittal1569@gmail.com

ABSTRACT

To determine the effect of vermicompost prepare from different organic waste like a coflower and green waste on the yield of the crop tomato (Dycopersicum esculentum) was taken to check the result. During the research all the parameters like germination time stem height, slim diameter, number of branches, number of leaves, leaf area, colour of leaf, eufloroscence time number of fruits quality of fruit extra were determined results revealed the addition of small quantity of vermicompost increase the quality and growth of tomatoes plants. The result showed post positive effects of vermicompost when added on the yield growth and alive mental content of plant as compared to control.

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INTRODUCTION

The reviews aim on the vermicompost application on tomato plant to assess the enhancement in production, quality, and other parameters of tomato plant (Solanum and Lycopessicum L). Tomato is very common fruit, vegetable found in the Aligarh region where this research work is being done.

It was observed through various data collections that nearly 80% farmers used fertilizers in the growth of tomato plants. Only 20% farmers were using the organic fertilizers, manure etc for growth. When comparative study was done it came into observation that the quality of tomato fruit grown originally was better than that grown using inorganic fertilizers. Even the crop yield also veried due to lack of nutrients in soil, the soil lost the nutrients and -due to continuous use of organic fertilizers which resulted in the reduction in fruit quality of tomato.

Vermicompost which is nutrient rich manure when applied could improve various physical chemical and biological properties of soil and thus result in improvement of yield and quality of tomato fruit. Vermicompost can be applied alone or combined with fertilizers and it can boost the perimeter of tomato plant and give healthy yield.

Different Vermicompost prepared from different Organics Substrates give different results due to variation in nutrient value of organic wastes. Vermicompost prepare from Kitchen waste (VCK) vermicompost prepared from flower and green waste (VCR).

Tomato (*Lycopersicon esculentum*) which is one of widely grown crop and use in large quantity in food, every Indian vegetables and dishes used tomato as one of the ingredient. Therefore the need to improve the yield and quality of tomato fruit was unsolved problem. Organically grown vegetables and fruits have increased with time as it not only improves yield but this type of farming minimizes environmental pollution. Tomato is a

very model plant usually chosen by the biologist the overall increase in the crop yield Materials and methods.

1. SELECTION OF THE SEEDS FROM THE MARKET:
Good quality seeds from the chaupal and agriculture related seeds and equipments outlet run by the semi government bodies) providing good quality of seeds.

2. PREPARATION OF MICRO PLOTS:
Micro plots were prepared which were properly clean and the cleaning of these micro plots was done mechanically with hand weed stones and other unwanted materials were removed. The tilling of the plots was donee to provide proper aeration to soil Plots were levelled with spade twicely and soil solarisation was done to destroy harmful tests and pathogens. Three microplots were prepared which were to be treated differently Microplot 1 was treated with vermicompost prepared from kitchen waste (VCK) Micro plot 2 was treated with the vermicompost prepared from the green and the flower waste (VCG) Microplot 3 not treated with any of the vermicompost and only 100% soil was used for the growing of tomato crops.

3. RIGHT TEMPERATURE OF SOWING SEEDS:
Temperature should be there when the seeds were soon in the November month when the temperature in Aligarh varies from 21 degree to 24 degree celsius which is the favourable temperature for the growth of tomato plants.

4. SOWING OF THE SEEDS PROPERLY
The seeds were sold overnight in warm water before seeing to soften the seed court and to speed up the germination time. Seeds of the tomato are small and if soon deeply they will not germinate. At the distance of 3 feet to 5 feet apart and about 4 cm depth was taken to those to sow the seeds for proper germination. The space between the sowing of the seeds was 60x30 cm maintained.

5. MAINTAINING OF PROPER SUNLIGHT:
Proper sunlight should reach each plant for proper growth for which the proper space was maintained and the micro plots were prepared in such a way that the proper sunlight should be available to each and every plant Sowing time also is good factor for the proper germination as during hot summers due to excessive heat the seeds made die.

6. PROPER AERATION AND MOISTURE:
Air circulation and moisture are also very important factors for germination of seeds and growing of healthy crops the moisture of the micro plots was maintained and checked regularly.

7. Watering properly at right time since the temperature was optimum neither too hot nor too cold therefore more watering was not required? Only little water sprayed maintained moisture of soil and kept soil wet which helped in germination of seeds and even after germination proper care was taken about the time and amount of water required by tomato plants for growth.
Overwatering of plants could harm germinating seeds and young saplings.

RESULT

Various parameters were taken into consideration and observation and comparative studies were done in three different microplots to see effects of vermicompost treated plants VCG and VCK and control.

1. Germination time of seeds

2. Stem height of tomato plants after regular intervals.
3. Stem diameter of tomato plants after regular intervals.
4. Leaf number and area of leaves of tomato plants
5. Number of branches
6. Flowering time of tomato plants.
7. Fresh shoot and root weight
8. Dry shoot and root weight
9. Fruit number on tomato plants
10. Fruit colour and quality of tomatoes

Germination time of seedss usually ranges from 7 to 12 times Mean Germination time calculated of microplot treated with vermicompost made from kitchen waste (VCK) about 7 days was (7+-0.5 days). Mean germination time calculated of microplot treated with vermicompost made from green and flower waste (VCG) was about 8 to 9 days (8.01+-1) Mean germination time of control micro plot was 9 to 11 days (9.26+-2).

It showed that germination time varied with the treatment of vermicompost and even germination time of seeds in microplot treated with VCG and VCK showed variation. Stem height of tomato plants was recorded and noted comparativity of the three microplots treated with different vermicompost and control (mean+-SEM) was measured in centimetres. Mean stem height of tomato plants in microplot treated with vermicompost made from kitchen waste (VCK) measured in centimetres (mean+-SEM).

After 7 days it was (17.80 +- 1.80) after 21 days (30.32 +- 4.1 0) after 35 days it was (63.05 +- 3.07,) after 49 days (84.50 +- 5.37) and after 70 days it was (95.80 +- 8.30) measured. Percentage increase in stem height was 78%. Mean stem height of tomato plants in microplot 2 treated with vermicompost made from green and flower waste (VCG) showed the given result at different intervals.

After 7 days the stem height was (16.05 +- 2.00)after 21 days it was (27.96 +- 5.05) after 35 days it was (55.07 +- 4.03) after 49 days it was (73.00 +- 5.34) and after 70 days it was (90.40 +- 4.65) measured.

Percentage increase in stem height was 74.35%.

Stem height of tomato plant in micro plot 3 which was not treated with any kind of fertilizers 100% soil. Stem height after 7 days was (13.5 0 +- 1.55) after 21 days (22.52 +- 3.43) after 35 days (36.82 +- 8.20) after 49 is it was (53.70 +- 11.90) and after 70 days it was (80.58 +- 12.5) percentage increase in height was 67.08%.

Stem diameter was also measured after regular interval of 50 days 30 days 45 days 60 days was also measured. The stem diameter of microplot treated with VCK was measured which was (0.50 +- 0.03 inches) after 15 days it was (0.76 +- 0.05 inches) after 30 days (1.05 +- 0.11 inch) after 45 days and (1.80 +- 09 inch) after 60 days when measured.

In Microplot 2 which treated with vermicompost prepared from the flower waste and green waste (VCG) after 15 days diameter was (0.52 +- 0.04inch) after 30 days (0.70 +- 0.07inches) after 45 days (0.97 +- 0.12 inches) and after 60 days 1.10 +- 0.08 inches).

Means stem diameter of tomato plant in the micro plot 3 control which had only 100% soil after 15 days the mean stem diameter was (0.36 +- 0.05 inch) after 30 days (0.4 +- 0.08 inches) after 45 days (0.64 +- 0.09 inch) and after 60 days it was (0.74 +- 0.07inches). Number of branches of tomato plant in different micro plots at regular interval from 15 days to 60 days number of branches of tomato plant in micro plot created with VCK showed these result After 15 days (0.58 +- 6.30), after 30 days (0.97 +- 10.69) after 45 days (2.04 +- 15.80)after 60 days (4.5 +- 22.40).

Number of branches of tomato plant in micro plot 2 treated with vermicompost made from Green waste (VCG) after 15 days (0.60 +- 5.40).

after 30 days (0.94 +- 9.80)

after 45 days (2.38 +- 16.30)

after 60 days (2.40 +- 21 .8)

Number of branches of tomato plant in micropro 3 control 100% soil
after 15 days (0.85 +- 4.50)
after 30 days,(1.05 +- 7.40)
after 45 days (1.35 +- 10.36)
after 60 days(1.86 +- 2.10)

Leaf number and leaf area of tomato plant in microploted. Since tomatoes are dicotyledonous plants and they grow series of branching stem which bears leaves. Shape of the tomato leaves varies from serrated into dark green. Leaf width varies a lot small narrow curled to wide and long leaves that droop down. Width and of each sample tomato leaf was measured with help of ruler in centimetre. Length was measured in centimetres and the distance between the first leaf let on rachis to last end. Width was measured in centimetres most wide leave from the plant from one and to another end horizontally. Measurement of the leaf length and width the leaf area was measured using formula.

Leaf area (LA) = Length (L) × Width (W) cm square

The same procedure was followed taking samples of tomato leaves from different microplots. This method was repeated for nearly 120 leaves leaf length varied from 70 cm to 42 cm. Leaf width (W) from 6.5 to 50 cm, Leaf area varied from 22 to 12 80 cm square. Number of leaves were counted mechanically with hands taking two samples tomato plants from each microplots Leaf number did not show much variation the colour of tomato leaves grown in micro plot treated with VCK showed brightness in colour as compared to the leaves of tomato plants grown in microplot treated will VCG and control. Plants Flowering time in microplot 1 was (23 +- 1 days) microplot 3 treated with vermicompost prepared from the flower waste and green waste (VCG) (26 +- 2 days) Flowerig time of micro plots showed little delay as compared to the tomato plants in other two microplots from 28 days to 30 days number of flowers were more in the microplots which was treated with m vermicompost made from nutrients rich vermicompost Highest fresh shoot (12:30 +- 30 gram) was of V CK treated tomato plants and lower fresh shoot rate was of control plants which was only (181 +- 0.5 gm) where is highest dry shoot was 375 +- 1.06 gm and lowest dry shoot weight was 65 +- 0.50 gram controls plants

DISCUSSION

Many research works and studies have been done to know the effect of vermicompost on the yield quality and the growth of various plants.

Even if little amount of vermicompost is added the improvement in growth of plants was observed this maybe due to change and improvement in physio chemical properties, increase enzymatic activity, plants growth regulators and nutritional factors, microbial diversity increase etc (Aracon et al 2004). From results it is clear that nearly all the parameters may be the stem height germination time, leaf number, leaf colour number of branches, fruit quality, fruit numbers they all showed quite an improvement in vermi compost as compare to control.

Germination time of VCK was (7.50+- 0.05) and of VCG was (8.01+- 1) and of control plants was (9.26 +- 2) this shows that the vermicompost meet from the kitchen waste was nutrient rich and it reduce the germination time of the seeds. Stem height of the plants also very and the percentage increase in the stem height very from 78% in VCK plants and 74.3% in VCG plants and 67.8% which was quite less in the control plants. All the other parameters also showed a comparative variation in the measurements and weights.

Morning time and flower number also was more in the micro plot one and two as compared to the micro plot 3 which also clearly shows that the vermi compost treated plants were nutrient rich and the show the variation in the fruit flower number fruit quality yield and colour of the fruit.

CONCLUSION

The results of the observations and the data collections and test show that the vermicompost enhances the growth and yield of the tomato plant. This enhancement in growth fruit quality and hill court associate with greater presence of nutrients such as potassium Phosphorus, Iron and Zinc in vermicompost and specially the variety of nutrients that are present in the kitchen waste because of the variety of fruits feels vegetable peels and other minerals and vitamins present in the organic substance used in the kitchen.

It can also be concluded that the nutrient value varies with the quality and variety of organic subtracts used for vermicomposting and these effects can be observed in the growth and the yield of the crop Gopal Reddy and Suryanarayan Reddy (1998), Wong et al (1999) that the increasing in Iron and zinc uptake by the plants is associated with their amount in vermicompost extract decrease of pH of soil by the organic acids which are produced in the vermicompost and mineralisation of organic matter.

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