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Effect of vermicompost and *Parthenium* compost on growth and yield of Brinjal (*Solanum melongena* L. cv. Panchganga)

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ABSTRACT

Brinjal (*Solanum melongena* L.) is an easily cultivated fruit vegetable belonging to family Solanaceae, which can grow all over the world round the year. In India, Brinjal plant contributes 9% of total vegetable production. Brinjal is a rich source of carbohydrates, proteins, fibers, vitamins and minerals. It is easily available in market and has been a common vegetable in diet. Different parts of brinjal plant and fruits are used as medicines in various countries for healing kidney stones, liver disorders and diabetes. *Parthenium hysterophorus* L. accidently introduced in India through the imported food grains in 1955. It is spreading in India in alarming rate because it can adopt any conditions easily. This plant is a defamed plant in view of its toxic and allergic properties. It has nearly destroyed all the useful crops and plants, growing near to it. The economic use is impaired by its toxic effect that is why the composting from rich nutrient content of *Parthenium* plant might be a useful alternative to be used as a soil conditioner. The *Parthenium* compost contains two times more nitrogen, phosphorus and potassium than Farm Yard Manure (FYM). In spite of enough quantity of various essential macro and micro plant nutrients, composting of *Parthenium* is not practiced by farmers. The objective of our research is to see the effect of urea, vermicompost and *Parthenium* compost on growth and yield of Brinjal (*Solanum melongena* L. cv. Panchaganga).

Key words: *Brinjal, Parthenium compost, Urea, Vermicompost*

Introduction

Brinjal (*Solanum melongena* L.) is an easily cultivated fruit vegetable belonging to family Solanaceae, which can grow all over the world round the year in India, Brinjal plant contributes 9% of total vegetable production. Brinjal is a rich source of carbohydrates, proteins, fibers, vitamins and minerals. It is easily available in market and has been a common vegetable in diet. Different parts of brinjal plant and fruits are used as medicines in various countries for healing kidney stones, liver disorders and diabetes.

Brinjal (*Solanum melongena* L.) grows to a height of 60-120cm. The plant is erect, compact, well branched having fibrous root system. Leaves are simple, large, lobed and alternate. Both the leaves and stem are covered with fine hairs. The flowers sprout singly or in small clusters from the leaf axis. The individual flower is star-shaped, large and has a short stalk. It is light purple, violet or white in colour with five stamens attached to the corolla tube and a single superior ovary. Fruit is pendent, fleshy berry having ovoid, oblong, ob-ovoid to long cylindrical shape. Its colour varies from shiny purple,

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white, green, yellowish or striped. The seeds are borne on the fleshy placenta which fills the locular cavity completely.

Parthenium hysterophorus L. accidently introduced in India through the imported food grains in 1955. It is spreading in India in alarming rate because it can adopt any conditions easily. This plant is a defamed plant in view of its toxic and allergic properties. It has nearly destroyed all the useful crops and plants, growing near to it.

Both humans and animals can be harmed by this plant. The diseases like asthma, bronchitis, dermatitis and hay fever can be caused due to this weed. The economic use is impaired by its toxic effect that is why the composting from rich nutrient content of *Parthenium* plant might be a useful alternative to be used as a soil conditioner. The *Parthenium* compost contains two times more nitrogen phosphorus and potassium than Farm Yard Manure (FYM).

In spite of enough quantity of various essential macro and micro plant nutrients, composting of *Parthenium* is not practiced by farmers.

The objective of our research is to see the effect of urea, vermicompost and *Parthenium* compost on growth and yield of Brinjal (*Solanum melongena* L. cv. Panchaganga).

Materials and Methods

The seedlings of Brinjal (*Solanum melongena* L.) variety Panchaganga were obtained from local nursery of Baramati. Vermicompost and *Parthenium* compost is prepared in botanical garden of our college and used for the experiment. The experiments were conducted at P. G. Research Centre, Botany Department, Tuljaram Chaturchand College, Baramati, Dist. Pune (M.S.) during 2016-17 using field experiment.10 x 10 sq. foot field area was selected for experiment and seedlings were sowed and watered as per need. All necessary intercultural operations were performed as and when required. Plants were analyzed at 60th DAS for various growth parameters, biochemical constituents and enzyme activities. The experiments were conducted in five replicates.

The various growth parameters of root, stem and leaf like length and diameter of root and stem, number of leaves per plant and leaf area were measured at 60th DAS using standard laboratory methods.

The freshly harvested leaf from top of different plants from treatment and control was collected, cleaned properly blotted dry, cut into small pieces and the composite leaf sample was prepared. The composite sample of leaf was used for different physiological analysis. Biochemical constituents like total soluble proteins total carbohydrates were measured in leaf of brinjal at 60th DAS. The total soluble proteins were estimated by using the method of Lowry (1951). The total carbohydrates were estimated according to the method of Hedge and Hofreiter (1962). The enzyme catalase was assayed according to the method of Herbert (1955). The activity of peroxidase enzyme was determined according to the method of Maehly (1954). The activity of enzyme polyphenol oxidase was determined following the method of Sata and Hasegawa (1976).

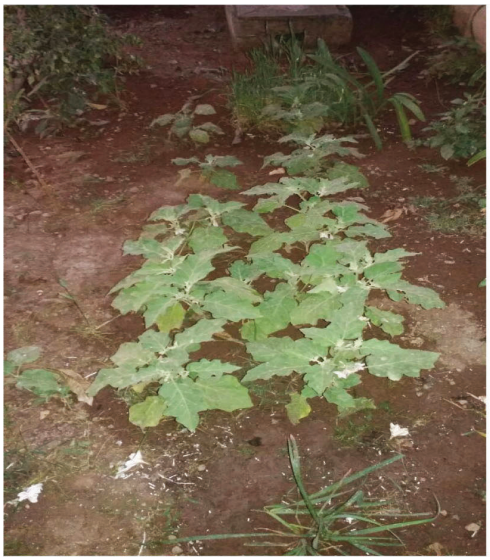
Results and Discussion

The effect of Vermicompost and *Parthenium* compost on seedling growth of brinjal (*Solanum melongena* cv. Panchaganga) was studied at 60th DAS. The growth parameters like plant height, no. of leaves, leaf area, root length, no. of flowers/plant and no. of fruits/plant showed increase in Parthenium compost as compared to control and vermicompost. The same pattern is observed in case of biochemical constituents and enzyme activity in brinjal.

Table 1. Effect of Vermicompost and *Parthenium* compost on seedling growth of brinjal (*Solanum melongena* L. cv. Panchaganga) at 60th DAS.

Parameters	Control	Vermicompost	*Parthenium* compost
Plant height	17cm	19cm	32cm
No. of leaves	10	16	20
Leaf area	147.6cm^2	252.3cm^2	253.0cm^2
Root length	7cm	9cm	10cm
No. of flowers/plant	11.3	19.0	26.1
No. of fruits/plant	10.0	16.5	22.5

PHOTOPLATE - 1



CONTROL

VERMICOMPOST

CONTROL

PARTHENIUM COMPOST

Table 2. Effect of Vermicompost and *Parthenium* compost on biochemical constituents in brinjal (*Solanum melongena* L. cv. Panchaganga) at 60th DAS.

Parameters	Control	Vermicompost	*Parthenium* compost
Total Proteins (mg/g fresh wt.)	11.0	18.4	21.5
Total Carbohydrates (mg/g fresh wt.)	13.9	24.0	23.0

Table 3. Effect of Vermicompost and Parthenium compost on enzyme activity in brinjal (*Solanum melongena* L. cv. Panchaganga) at 60th DAS.

Parameters	Control	Vermicompost	*Parthenium* compost
Peroxidase	2.7	3.8	3.5
Catalase	1.4	3.2	3.6
Polyphenol oxidase	0.2	0.25	0.27

Conclusion

The organic nutrient in *Parthenium* plants exhibited its significance of its utilization as compost in agriculture. Beside burning or destruction of this agriculture waste the composting of *Parthenium* serves for a dual purpose of eradication of the weed as well as for a better utilization as compost for better crop production and can be good source of employment and income for villagers.

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