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Effect of fresh, composted and vermicomposted parthenium and poultry droppings on yield and quality of Radish (*Raphanus sativus* var.pusa chetki)

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ABSTRACT

A pot culture experiment was conducted to assess the effect of fresh, composed, and vermicomposted *parthenium* and poultry droppings on the yield and quality of radish. There were fifteen treatments in different dosages each with three replications. Among the treatments radish bettle length was more in T_2 on 45 DAS. The bettle diameter was increased due to T_5 on 45 and T_1 on 60 DAS. The bettle weight of radish was maximum in T_4 on 60 DAS. In radish bettles increased ascorbic acid content was in T_8 and T_4 radish had higher protein content.

KEYWORDS

Radish;
Compost;
Yermicompost;
Parthenium;
Poultry droppings;
Yield;
Quality attributes.

INTRODUCTION

With the Green Revolution and its positive contribution to the nation's self sufficiency fast on the ebb, the 21st century India is in the need of another revolution in its farming sector. While a few argue that biotechnology is the panacea, a few others vociferously prescribe organic farming in the context of a second Green Revolution[1].

The increasing cost of fertilizer, growing environmental concern and energy crisis have created considerable interest for search of alternative cheap sources of plant nutrients. The use of vermicompost, as a source of organic manure in supplementing chemical fertilizer is becoming popular among farmers of the country. Vermicompost is sustainable supplementary organic manure regenerated from organic waste using earthworms. Vermicompost is rich in nutrients and organic matter content. It can be used by the farmers, horticulturists, floriculturists and garden lovers.

Composting is a biological process in which microorganisms, mainly fungi and bacteria, convert degradable organic waste into humus like substance. This finished product, which looks like soil, is high in carbon and nitrogen and is an excellent medium for growing plants. The process of composting ensures the waste that is produced in the kitchens is not carelessly thrown and left to rot. It recycles the nutrients and returns them to the soil as nutrients.

Though soil is the most vital input for food production, it is generally in a degraded condition due to many reasons and indiscriminate use of chemical fertilizers is the prime reason among them. Since improving the soil health by adding organic manure is a priority. High quality organic manure can be prepared by the agriculturists themselves in their farms by establishing vermicompost

unit using biodegradable farm waste available in their farms such as dried leaves, vegetable and fruit waste and crop remains, which is burned otherwise[2].

The objective of the present study was to determine the effect of fresh, composted and vermicomposted parthenium and poultry droppings in improving the yield and quality of radish.

Radish is one of the most ancient and widely cultivated vegetable of temperate region in almost all altitudinal zones. This vegetable being a good source of vitamin C and minerals is grown for its tender roots as a cooking vegetable.

MATERIALS AND METHODS

A pot culture experiment was conducted using 7kg capacity pots to study the effects of fresh, composted and vermicomposted parthenium and poultry droppings on yield and quality of radish. The radish was grown in completely randomized design with three replications. The dosages were as per the recommendations of Tamil Nadu Agricultural University, Coimbatore.

The treatment details

T_0 - Control – Red loamy soil (7 kg)
T_1 - Fresh *Parthenium* @ 35 g per pot
T_2 - Composted *Parthenium* @ 26.25 g per pot
T_3 - Composted *Parthenium* @ 35.0 g per pot
T_4 - Composted *Parthenium* @ 43.75 g per pot
T_5 - Vermicomposted *Parthenium* @ 26.25 g per pot
T_6 - Vermicomposted *Parthenium* @ 35.0 g per pot
T_7 - Vermicomposted *Parthenium* @ 43.75 g per pot.
T_8 - Poultry droppings @ 35.0 g per pot
T_9 - Composted poultry droppings @ 26.25 g per pot
T_{10} - Composted poultry droppings @ 35.0 g per pot
T_{11} - Composted poultry droppings @ 43.75 g per pot
T_{12} - Vermicomposted poultry droppings @ 26.25 g per pot
T_{13} - Vermicomposted poultry droppings @ 35.0 g per pot
T_{14} - Vermicomposted poultry droppings @ 43.75 g per pot
T_{15} - N: P: K (60:30:30 kg/ha)

Yield components

Bettle length of a radish is measured with a scale and expressed in cm. The diameter of a bettle was measured using a thread and recorded in cm. The weight of a bettle was measured and expressed in g. The protein content was estimated following the method of Lowry et al.[3] and ascorbic acid by the method of Sadasivam and Theymoli[4].

Statistical analysis

The data collected from the different studies were subjected to statistical analysis as per the procedure outlined by Panse and Sukhatme[5].

RESULTS AND DISCUSSION

The yield components of radish namely bettle length, bettle diameter and bettle weight were recorded on 45 and 60 DAS (TABLE 1). The protein and ascorbic acid in the bettle were tested on 60 DAS (TABLE 2).

The bettle length of radish (*Raphanus sativus*) on 45 DAS was significantly high in T_2 (11.13 cm) among *Parthenium* applications and T_{15} (10.50 cm) compared to control (6.33 cm). On 45 DAS, among *Parthenium* and poultry droppings supplied plants, the bettles from T_5 and T_{14} had increased diameter of 7.97 and 7.10 cm compared to control (4.47 cm). The T_1 and T_{12} treatments recorded the highest values (11.90 and 11.30 cm) among *Parthenium* and poultry droppings applications on 60 DAS compared to the lowest value in control (8.63 cm). Bettle weight of radish (*Raphanus sativus*) was observed on 60 DAS and significantly higher values were found in T_1 (95.00 g) and T_{14} (98.33

TABLE 1: Impact of fresh, composted and vermicomposted *Parthenium* and poultry droppings on yield components of *Raphanus sativus*

Treatments	Bettle length (cm)		Bettle diameter (cm)		Bettle weight (g)
	45 DAS	60 DAS	45 DAS	60 DAS	60 DAS
T_0	6.33	9.70	4.47	8.63	38.67
T_1	10.27	13.27	7.27	11.90	95.00
T_2	11.13	12.53	7.07	10.80	83.33
T_3	9.97	10.80	7.57	11.10	70.67
T_4	10.23	13.70	7.83	10.50	78.33
T_5	9.80	12.80	7.97	11.43	74.33
T_6	9.00	12.23	6.13	9.77	73.33
T_7	8.00	11.50	7.50	10.97	70.00
T_8	8.17	12.50	4.50	10.70	83.33
T_9	8.27	12.53	4.87	9.00	56.67
T_{10}	8.77	11.33	5.27	10.20	70.00
T_{11}	8.40	11.50	5.90	10.63	66.67
T_{12}	9.23	15.40	6.37	11.30	81.67
T_{13}	10.27	14.33	6.53	10.97	86.67
T_{14}	9.90	14.17	7.10	11.23	98.33
T_{15}	10.50	13.33	4.63	10.77	66.67
SEd	0.98	NS	0.66	0.78	9.97
CD (5%)	2.00		1.34	1.58	20.30

SEd – Standard error deviation; CD – Critical difference; DAS – Days after sowing

TABLE 2: Impact of fresh, composted and vermicomposted *Parthenium* and poultry droppings on yield components of *Raphanus sativus*

Treatments	Protein (60 DAS)	Ascorbic acid (60 DAS)
T_0	2.12	285.33
T_1	2.70	618.67
T_2	2.42	432.00
T_3	3.17	720.00
T_4	4.47	576.00
T_5	4.46	720.00
T_6	2.42	576.00
T_7	2.53	642.67
T_8	2.41	1032.00
T_9	2.33	541.33
T_{10}	2.44	384.00
T_{11}	2.49	456.00
T_{12}	2.83	456.00
T_{13}	2.49	480.00
T_{14}	2.64	624.00
T_{15}	2.72	360.00
SEd	0.18	90.54
CD (5%)	0.37**	184.44**

SEd-Standard error deviation; CD- Critical difference; DAS-Days after sowing

g) among fresh and decomposed *Parthenium* and poultry droppings treatments compared to control (38.67 g).

Protein contents were found to be higher in T_4 (4.47 mg g^{-1}) and T_5 (4.46 mg g^{-1}) among *Parthenium* treatments. T_{12} (2.83 mg g^{-1}) registered the highest value among poultry droppings applications. Protein content was very low in control (2.12 mg g^{-1}).

Maximum ascorbic acid content of radish (*Raphanus sativus*) was noticed in T_3 and T_5 (720.00 mg g^{-1}) among *Parthenium* applied crops. T_8 exhibited the highest value of 1032.00 mg g^{-1} among poultry droppings treatments. The control recorded the lowest value of 285.33 mg g^{-1}.

As in the present study Govindan et al.[6] also obtained maximum yield of *Abelmoschus esculentus* by vermicompost application. Increased grain yield of corn due to application of beef lot manure and its compost was reported by Eghball et al.[7]. Application of compost prepared from crop residue and poultry manure resulted in highest yield of maize[8]. The increase in yield may be due to the micro nutrients in organic source and bio active compounds formed during the composting of manures.

Treatment with biofertilizer +dense organic manure recorded the highest vitamin C content of radish, FYM + dense organic manure recorded the highest protein content of radish[9].

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