



P-ISSN: 2349-8528  
E-ISSN: 2321-4902  
IJCS 2019; 7(4): 90-93  
© 2019 IJCS  
Received: 14-07-2019  
Accepted: 22-08-2019

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## Influence of different sources of organic manures on growth and yield of eggplant (*Solanum melongena. L*)

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### Abstract

A field experiment was conducted to evaluate the influence of different source of organic manures on growth and yield of eggplant (*Solanum melongena. L*) During Kharif, At Regional Horticultural Research and Extension center, College of Horticulture, UHS, Campus GKVK, Bengaluru, Karnataka India. The experiment consisting 10 treatments replicated thrice. Significantly higher plant height (26.17, 108.40, 123.53), number of branch (7.53, 9.46, 11.53), at 30, 60 and 90 DAT, number of fruits per cluster (4.68, 4.22) at 60 and 90 DAT, average yields per plant (4.19) and yields per hectare (58.19 tons) were recorded with application of Vermicompost equivalent to N content of FYM + 100% N equivalent through panchagavya as top dress (Ts) respectively.

**Keywords:** Solid and liquid organic manures, growth and yields of eggplant

### Introduction

Brinjal or eggplant (*Solanum melongena L.*) of the family Solanaceae is one of the important and popular vegetable crops grown in India and other parts of the world. Various sizes, shapes, colours and forms of cultivated as well as wild type of brinjal are found in India, The brinjal fruit has cardio tonic, laxative and analgesic properties and enriches the blood. The technique of organic farming is plays a role in cultivation of high value of vegetables crops. The great export potential of food crops, growing at 10-15% which had organically cultivated, suitable agriculture practices can minimize the entry of the pesticides and toxicants and prevent the water pollution of the soil and soil fertility Mishra *et al.* 2018 [6].

Organic farming is a holistic way of farming with the aim of conserving the natural resources. Indian agriculture has a better chance to convert itself as organic agriculture because, the per capita and per hactae consumption of chemical fertilizers and pesticides in the country is much lower than the global estimates Boraiah *et al.* (2017) [1]. Organically produced fruits, vegetables, spices and condiments, crops, medicinal and aromatic plants *etc.*, have good keeping quality than that of conventionally grown products. Sustainable agriculture practices can effectively prevent the entry of pesticides and toxicants in the food chain and prevent soil and water pollution. It is adopted with a blend of ecologically safe modern technologies. The organic agriculture, though not in its orthodox version, has the potential to be accepted by the farmers (Sreenivasa *et al.*, 2009 and Natarajan, 2007) [14, 7]. FYM, Poultry manures, vermicompost are cheaper made by farmer from available organic material, also Panchagavya, Jeevamruth and Bio digester are cheaper eco-friendly organic preparations made by cow products namely dung, urine, milk, curd and ghee. The Panchagavya is an efficient plant growth stimulant that enhances the biological efficiency of crops. It is used to activate soil and to protect the plants from diseases and also increase the nutritional quality of fruits and vegetables. It is used as a foliar spray, soil application along with irrigation water, seed or seedling treatment *etc.* 3 per cent Panchagavya is an ideal concentration for the foliar spray. And also it's Promotes immense biological activity in soil and makes the nutrients available to crop. (Devakumar *et al.*, 2008) [2]. the cost of inorganic fertilizers is increasing enormously to an extent that they are out of reach of small and marginal farmers. Use of inorganic fertilizers and insecticides, the population of beneficial organisms decrease and natural regeneration of nutrition in the soil cease. Soil becomes barren and soil fertility decreases.

### Material and methods

A field experiment was conducted at Regional Horticulture Research and Extension Centre, College of Horticulture, UHS, campus, GKVK, Bengaluru, Karnataka India. Soil of the experimental plot is red sandy loam, grouped under the classification of Alfisols. Initial composite soil sample from a depth of 0-30 cm was collected from the experimental plot before imposing treatments, soil was near to neutral in reaction pH (7.32), medium in organic carbon (0.72%), medium in available nitrogen (332.56 kg ha<sup>-1</sup>), medium in available phosphorus (39.45 kg ha<sup>-1</sup>), and medium in available

potassium (288.45 kg ha<sup>-1</sup>) content. The trial was laid out in Randomized complete block design with ten treatments and three replication.

Recommended package of practice was (125:100:50 NPK Kg ha<sup>-1</sup> + 25 tons of FYM), Solid organic manures (poultry manures, and vermicompost) three weeks before were applied based on N content of FYM, and liquid organic manures (panchagavya, jeevamrutha, and bio digester) were applied at 3 days interval at 3% through foliar application and same was drenched in soil as mentioned in Table 1.

**Table 1:** Liquid organic manures application and its quantity

S. No.	Quantity applied ha <sup>-1</sup>	Nitrogen content applied per time	No to times applied	Total Nitrogen applied ha <sup>-1</sup>
1	1000 kg	4.5 kg	28	126.00 kg
2	1300 kg	4.29 kg	29	124.41 kg
3	1200 kg	4.32 kg	29	125.28 kg

### Result and discussion

Significantly higher plant height (26.17 cm) at 30 DAT recorded with (T<sub>5</sub>). However, it was on par with (T<sub>8</sub>) 26.01 cm and with (T<sub>6</sub>) 25.86 cm. The lower plant height was recorded with (T<sub>4</sub>) 21.73 cm at 30 DAT. Similarly, at 60 DAT, significantly higher plant height recorded 108.40 cm with (T<sub>5</sub>) which was on par with all the treatments except (T<sub>4</sub>) (96.50 cm). However, there was non-significant difference between all the treatments at 90 DAT with respect to plant height Table 2. These might be due to vermicompost contain more amount of available major and micro nutrient specially nitrogen which are responsible for plant height, it also

enhances the organic carbon of soil by increasing microbial activity and microbial biomass, which are key components in nutrient recycling and increasing the indigenous plant growth regulators result in increase in plant growth, finding confirmed with the result obtained by Suge *et al.* (2011) [16], Kashyap *et al.* (2014) [4] and Samadhiya *et al.* (2015) [12]. Panchagavya also contain adequate amount of nutrient, microbial load and growth regulators hormone which are responsible for plant growth finding confirmed by Patel *et al.* (2013) [10], Leo *et al.* (2013) [5] and Mohan and srinivasa (2008) [7]. They recorded highest growth and yield parameter with at 3% panchagavya application.

**Table 2:** Effect of different organic manures sources on plant height (cm) at 30, 60, and 90 days after transplanting

Treatment details	Plant height (cm)		
	30 DAT	60 DAT	90 DAT
T <sub>1</sub> - Recommended package of practice (125:100:50 NPK Kg ha <sup>-1</sup> + 25 tons of FYM) (Control)	22.73	100.01	119.67
T <sub>2</sub> - Recommended FYM ha <sup>-1</sup> as a basal dose + 100% N equivalent through Panchagavya as a top dress	22.71	99.87	119.12
T <sub>3</sub> - Recommended of FYM ha <sup>-1</sup> as a basal dose + 100% N equivalent through Bio digester liquid as a top dress	21.98	99.10	118.78
T <sub>4</sub> - Recommended of FYM ha <sup>-1</sup> as a basal dose + 100% N equivalent through Jeevamrutha as a top dress	21.73	96.50	116.33
T <sub>5</sub> - Vermicompost equivalent to N content of FYM + 100% N equivalent through Panchagavya as a top dress	26.17	108.40	123.53
T <sub>6</sub> - Vermicompost equivalent to N content of FYM + 100% N equivalent through Bio digester liquid as a top dress	25.86	106.98	122.02
T <sub>7</sub> - Vermicompost equivalent to N content of FYM + 100% N equivalent through Jeevamrutha as a top dress	23.55	104.34	121.89
T <sub>8</sub> - Poultry manure equivalent to N content of FYM + 100% N equivalent through Panchagavya as a top dress	26.01	103.11	122.65
T <sub>9</sub> - Poultry manure equivalent to N content of FYM + 100% N equivalent through Bio digester liquid as a top dress	23.52	108.21	120.11
T <sub>10</sub> - Poultry manure equivalent to N content of FYM + 100% N equivalent through Jeevamrutha as a top dress	22.78	101.87	120.02
S.Em±	0.82	3.54	4.15
CD @ 5%	2.40	10.41	12.19

**Table 3:** Effect of different organic manures sources on number of branches at 30, 60 and 90 days after transplanting

Treatment details	Number of Branches		
	30 DAT	60 DAT	90 DAT
T <sub>1</sub> - Recommended package of practice (125:100:50 NPK Kg ha <sup>-1</sup> + 25 tons of FYM) (Control)	6.78	8.54	10.56
T <sub>2</sub> - Recommended FYM ha <sup>-1</sup> as a basal dose + 100% N equivalent through Panchagavya as a top dress	6.60	8.43	10.43
T <sub>3</sub> - Recommended of FYM ha <sup>-1</sup> as a basal dose + 100% N equivalent through Bio digester liquid as a top dress	6.12	8.13	10.15
T <sub>4</sub> - Recommended of FYM ha <sup>-1</sup> as a basal dose + 100% N equivalent through Jeevamrutha as a top dress	6.00	8.00	10.00
T <sub>5</sub> - Vermicompost equivalent to N content of FYM + 100% N equivalent through Panchagavya as a top dress	7.53	9.46	11.53
T <sub>6</sub> - Vermicompost equivalent to N content of FYM + 100% N equivalent through Bio digester liquid as a top dress	7.12	9.11	11.25
T <sub>7</sub> - Vermicompost equivalent to N content of FYM + 100% N equivalent through Jeevamrutha as a top dress	7.02	9.02	11.14
T <sub>8</sub> - Poultry manure equivalent to N content of FYM + 100% N equivalent through Panchagavya as a top dress	7.43	9.32	11.46
T <sub>9</sub> - Poultry manure equivalent to N content of FYM + 100% N equivalent through Bio digester liquid as a top dress	7.01	8.98	11.01
T <sub>10</sub> - Poultry manure equivalent to N content of FYM + 100% N equivalent through Jeevamrutha as a top dress	6.89	8.76	10.87
S.Em±	0.24	0.30	0.37
CD @ 5%	0.69	0.89	1.10

Significant higher number of branch per plant at 30 DAT (7.53) was recorded with T<sub>5</sub>, it was on par with T<sub>8</sub>- (7.43), T<sub>6</sub>- (7.12), T<sub>7</sub>- (7.02), T<sub>9</sub>- (7.01) and T<sub>10</sub>- (6.89). The lowest

number of branches per plant (6.00) was observed with (T<sub>4</sub>). Whereas, at 60 DAT similar result was recorded. however, at 90 DAT, (T<sub>5</sub>) recorded significantly high number of branch

(11.53) which was on par with all the treatments except T<sub>3</sub> - (10.15) and T<sub>4</sub> - (10.00) respectively Table 3. It might be due to adequate amount of nitrogen level present in vermicompost and panchagavya, increased vegetative growth resulted in initiated a greater number of branches of eggplant. Similar results have been reported by Yogananda *et al.* (2015) [18], they reported that 100% N through vermicompost and FYM increased the plant height and number of branches.

Significantly higher number of fruits per cluster observed in T<sub>5</sub> - (4.68), it was on par with the T<sub>8</sub> - (4.61), T<sub>6</sub> - (4.49), T<sub>7</sub> - (4.38) and with T<sub>9</sub> - (4.34) respectively. And the lowest number of fruits per cluster was recorded with T<sub>4</sub> - (3.02). This may be due to increase in height of the plant as well as earliness in the production of fruits. The partitioning efficiency viz., an increased leaf area might be due to increase in the synthesis as well as accumulation of cytokinin in the active sinks namely the productive flowers due to better root activity might have caused increased number of fruits. These observations were in conformity with the finding of Satesh and Sharma (2006) [13], supplementation of vermicompost and liquid organic manure (Panchagavya) resulted numerical increase in number of fruits in cluster in eggplant crop. Also it might have been due to accelerated mobility of photosynthates from the source to the sink as influenced by the growth hormone released or synthesized due to the organic source of vermicompost and panchagavya. These results were in conformity with the findings of Sutagundi (2000) [17] and Sudhakar (2000) [15] in chilli crop.

Significantly higher fruit yield per plant (4.19 kg) was observed under T<sub>5</sub>, it was on par with T<sub>8</sub> - (4.10 kg) and with T<sub>6</sub> - (3.99 kg) respectively. And the lower fruit yield/plant was recorded in T<sub>4</sub> - (2.89 kg) respectively. Similarly higher fruit yield per hectare (58.19 tons) was also recorded with (T<sub>5</sub>) it was on par with T<sub>8</sub> - (56.94 tons) and with T<sub>6</sub> - (55.41 tons) respectively. And the lowest fruit yield per hectare (40.14 tons) was observed with T<sub>4</sub> respectively Table 4.

Fruit yield in eggplant might be attributed to higher leaf area and leaf area index, and a greater number of flowers per plant as these parameters had a positive influence on fruit yield of eggplant. The beneficial response of organic manures like vermicompost and panchagavya on fruit yield in eggplant brought be due to the availability of sufficient amount of plant nutrients throughout the growth period of crop resulting in better uptake of nutrients, plant vigour and improved yield attributes. These observations are in close conformity with the finding of Patil *et al.* (2004), Rodge and Yadlod (2009) [11] in tomato crop.

The probable reason for enhanced fruit yield may be due to cumulative effects of nutrient (macro and micro) on vegetative growth which ultimately lead to more photosynthetic activities while, application of nutrient levels enhances carbohydrate and nitrogen metabolism of pectic substances, as well as improve the water metabolism and water relation in the plants. These findings are in agreement with the findings of Kumar and Gowda (2010) [3], Mujawar (2012) [8] and Kashyap *et al.* (2014) [4]

**Table 4:** Effect of different organic manures sources on yield attributes of eggplant

Treatment details	Number of fruits per cluster		Average yields per plant (kg)	Yield per hectare (tons)
	60 DAT	60 DAT		
T <sub>1</sub> - Recommended package of practice (125:100:50 NPK Kg ha <sup>-1</sup> + 25 tons of FYM) (Control)	3.76	3.76	3.27	45.41
T <sub>2</sub> - Recommended FYM ha <sup>-1</sup> as a basal dose + 100% N equivalent through Panchagavya as a top dress	3.54	3.54	3.10	43.05
T <sub>3</sub> - Recommended of FYM ha <sup>-1</sup> as a basal dose + 100% N equivalent through Bio digester liquid as a top dress	3.32	3.32	3.08	42.78
T <sub>4</sub> - Recommended of FYM ha <sup>-1</sup> as a basal dose + 100% N equivalent through Jeevamrutha as a top dress	3.02	3.02	2.89	40.14
T <sub>5</sub> - Vermicompost equivalent to N content of FYM + 100% N equivalent through Panchagavya as a top dress	4.68	4.68	4.19	58.19
T <sub>6</sub> - Vermicompost equivalent to N content of FYM + 100% N equivalent through Bio digester liquid as a top dress	4.49	4.49	3.99	55.41
T <sub>7</sub> - Vermicompost equivalent to N content of FYM + 100% N equivalent through Jeevamrutha as a top dress	4.38	4.38	3.79	52.64
T <sub>8</sub> - Poultry manure equivalent to N content of FYM + 100% N equivalent through Panchagavya as a top dress	4.61	4.61	4.10	56.94
T <sub>9</sub> - Poultry manure equivalent to N content of FYM + 100% N equivalent through Bio digester liquid as a top dress	4.34	4.34	3.64	50.55
T <sub>10</sub> - Poultry manure equivalent to N content of FYM + 100% N equivalent through Jeevamrutha as a top dress	3.98	3.98	3.38	46.94
S.Em±	0.14	0.14	0.12	1.67
CD @ 5%	0.41	0.41	0.36	4.96

From the analysis of data, it can be concluded that the use of vermicompost, poultry manures along with panchagavya at specific concentration considerably increased the growth and yields attributes of eggplant.

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