Original Research Article

# Effect of different organic manures on growth, yield and Quality of cucumber (*Cucumis sativus* L.) c.v. (Harsh) under Prayagraj agro climate condition


## ABSTRACT

A field experiment entitled "Effect of different organic manures on growth, yield and quality of cucumber (*Cucumis sativus* L.) c.v. (Harsh) under Prayagraj agro climate condition" was conducted in a Randomized Block Design with three replications during the *Summer* season, 2021 at Horticultural Research Farm, Department of Horticulture, Naini Agricultural Institute, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj with a view to determine the effect of organic manures application on cucumber variety Harsh for its growth, quality and yield and to work out the economics of various treatments. Under this experiment, overall 10 treatment combinations were taken *viz.* $T_0$ (Control), $T_1$ (FYM 75% + Poultry manure 25%), $T_2$ (FYM 75% + Vermicompost 25%), $T_3$ (FYM 25% + Poultry manure 75%), $T_4$ (Poultry manure 75% + Vermicompost 25%), $T_5$ (Vermicompost 75% + FYM 25%), $T_6$ (Vermicompost 25% + Poultry manure 25%), $T_7$ (FYM 50% + Poultry manure 50%), $T_8$ (Vermicompost 50% + Poultry manure 50%) and $T_9$ (FYM 50% + Vermicompost 50%). From the present investigation it was concluded that $T_8$ (Poultry manure 50% + Vermicompost 50%) was found to be best among all treatment in terms of growth, yield and quality of cucumber i.e. T.S.S. The highest net return was found from $T_8$ (Polutry manure 50% + vermicompost 50%) with ₹ 1,56,775 and the B:C ratio that is 1.92.


**Keywords:** FYM, Poultry manure, Vermicompost, T.S.S.

## INTRODUCTION

Cucumber (*Cucumis sativus*) is a widely-cultivated creeping vine plant in the *Cucurbitaceae* family that bears usually cylindrical fruits, which are used as vegetables. Considered an annual plant, there are three main varieties of cucumber — slicing, pickling, and burpless/seedless — within which several cultivars have been created. The cucumber originates from South Asia, but now grows on most continents, as many different types of cucumber are traded on the global market.

Botanically Cucumber is known as *Cucumis Sativus* L. belongs to family *Cucurbitaceae*. It is a diploid self-pollinated species with chromosome number 2n=2x=14 (**Karpechenko, 1925**). Cucumber probably originated from India (**De Candolle, 1967**). It is mainly cultivated in China, India, Turkey, Iran and other parts of south-east Asia. Progenitor of cucumber is "*Cucumis hardwickii".* Economic sex ratio is 15:1.

The area under Cucumber production in India accounts to 107 million ha with production of 1658 million tonnes in year 2018-19. (*Source: **NHB,*** **Ministry of Agriculture & Farmers Welfare, Government of India, 2019-20**). Haryana ranks first in area and production of Cucumber in year 2018-19 followed by Madhya Pradesh and Karnataka. The production of Cucumber in Uttar Pradesh is 81.47 million tonnes for year 2018-19. The cucumber is used as salad, pickles and also as cooked vegetable. It has many uses in ayurvedic medicines. According to 'Unani' medicines, the oil from its seed is god for the brain and the body. Cucumber has 96.3 g water, magnesium 11 mg, sodium 10.2 mg, Vitamin C 7 mg, 2.5g Carbohydrates, Oxalic acid 15 mg, Calcium 10 mg, Sulphur 17 mg, Potassium 50 mg and many other nutrients out of 100 g of edible portion. (**Choudhary and Basu, 1967**).

Cucumber is well adapted crop for warm-season crop and it does not withstand even light frost. The crop performs well in temperature range between 18°C- 24°C and soil having pH ranging between 5.5-6.7irrespective of its kind from sandy to heavy clay soil. It is grown as sole crop in India in *Zaid* and *Zaid* season. It is well suited to hot and warm climate with annual rainfall of 60-75 cm. However, cucumber cannot withstand water lodging. It is a short duration cucurbit crop, grown in all parts of India, well adapted crop for many diversified cropping systems. It is considered as quality dietary food due to its excellent digestibility and rich water content (96.3 g/100 g). Cucumber is a dependable laxative for those who suffer constipation. The juice of cucumber is a valuable food in the treatment of hyper acidity, gastric and duodenal ulcers.

Farmyard manure or FYM refers to the decomposed mixture of dung and urine of farm animals along with litter and left over material from roughages or fodder fed to the cattle. On an average well decomposed farmyard manure contains 0.5 per cent N, 0.2 per cent $P_2O_5$ and .0.5 per cent $K_2O$. Urine, which is wasted, contains one per cent nitrogen and 1.35 per cent potassium. The excreta of birds ferment very quickly. If left exposed, 50 percent of its nitrogen is lost within 30 days. Poultry manure contains higher nitrogen and phosphorus compared to other bulky organic manures. The average nutrient content is 3.03 per cent N; 2.63 per cent $P_2O_5$ and 1.4 per cent $K_2O$. Vermicompost is the product of the decomposition process using various species of worms, usually red wigglers, white worms, and other earthworms, to create a mixture of decomposing vegetable or food waste, bedding materials, and vermicast. This process is called vermicomposting, while the rearing of worms for this purpose is called vermiculture.

Intensive use of only chemical fertilizers to achieve high production has created various problems. Continuous application of heavy doses of chemical fertilizers without organic manures has led to deterioration of soil health in terms of physical and chemical properties of soil, decrease in soil microbial activities, and also reduction in soil humus (**Anjanappa *et al.*, 2011**). Intensive cultivation and improper fertilizer use leads to deficiency of nutrients, thus resulting in lower yield of crops. Therefore, the use of farm input in the form of organic manure has become necessary. Number of investigations were undertaken to study the effect of different chemical fertilizers on cucumber in different soils; on the other hand, the use of organic nutrient sources such as FYM, poultry manures, vermicompost *etc*. remains as alternative choice for the production of residue free wholesome produce, and to maintain soil health. The information on holistic approach with suitable combination of organic manure and inorganic fertilizers on growth and yield and quality of cucumber in soil of eastern region of Uttar Pradesh is very meager.

Keeping in view the above facts, the present investigation was undertaken entitled, ‘Effect of different organic manures on growth, yield and quality of cucumber (*Cucumis sativus* L.) c.v. (Harsh) under Prayagraj agro climate condition’.

## MATERIAL AND METHODS

The experiment was conducted in Randomized Block Design comprising 10 treatments with three replications during *Summer 2021-22* at Horticultural Research Farm, Department of Horticulture, Naini Agricultural Institute, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj.. The unit plot size was 2.25 $m^2$. The plants were planted with a spacing of 1.5 m between the rows and 90 cm between the plants. There were ten plants in each plot. The observations were recorded on randomly selected five plants on characters. In general, soil properties of experimental site showed a typical alluvial soil of eastern region of Uttar Pradesh. Soil was sandy loam in texture, slightly acidic in reaction and having low electrical conductivity, very high in organic carbon, low in available nitrogen, low in available phosphorus and moderately high in available potassium. Weeding and plant protection measure were followed as and when needed. Observations were recorded at different stages of growth periods. The data were statistically analyzed by the method suggested by **Fisher and Yates, 1936.**

## RESULTS AND DISCUSSION

In the present investigation an attempt has been made to study the effect of different organic treatment combinations on growth and yield of cucumber (*Cucumis sativus* L.) in Prayagraj climatic zone. The results obtained are presented in relevant Tables as follows

### A) Growth Parameters

Growth parameters comprised of percentage of seed germination, vine length (30, 45, 60 DAS), number of branches per plant, days to first emergence of male and female flower and node at first male and female flowers. The data for these characters observed has been listed out in table 1.1, 1.2 and 1.3.

### 1. Percentage of seed germination

The maximum value of percent of seed germination was observed for $T_4$ (Poultry manure 75% + Vermicompost 25%) with value 91.67% followed by $T_8$ (Poultry manure 50% + vermicompost 50%) with value of 95.83%. Minimum value of percent of seed germination was observed for $T_6$ (Vermicompost 25% + Poultry manure 25%) with value of 66.67%.

### 2. Vine length (cm) [30, 45 and 60 DAS]

The maximum Vine length (29.28 cm) at 30 DAS was observed with treatment $T_8$ (Poultry manure 50% + Vermicompost 50%) followed by $T_6$ (Vermicompost 25% + Poultry manure 25%) with 29.02 cm. Minimum Vine length (21.09 cm) was observed in $T_0$ (control), while the remaining treatments were moderate in their growth habit. The maximum Vine length (101.96 cm) at 45 DAS was observed with treatment $T_3$ (FYM 25% + Poultry manure 75%) followed by $T_1$ (Vermicompost 75% + FYM 25%) with 101.96 cm. Minimum Vine length (94.99 cm) was observed in $T_5$ (Vermicompost 75% + FYM 25%), while the remaining treatments were moderate in their growth habit. The maximum Vine length (162.99 cm) at 60 DAS was observed in treatment $T_8$ (Poultry manure 50% + Vermicompost 50%) followed by $T_6$ (Vermicompost 25% + Poultry manure 25%) with 162.19 cm. Minimum Vine length (155.17 cm) was observed in $T_0$ (control), while the remaining treatments were moderate in their growth habit. The application of organic manures might have improved the soil physical and chemical properties and leading to the adequate supply of nutrients to the plants which might have promoted the maximum vegetative growth while the minimum plant growth was due to non-availability of nutrients. Similar findings were reported by **Ikeh (2012); Hamdi *et al.* (2017); Ghayal *et al.* (2018) and Tahir *et al.* (2019)** in cucumber.

### 3. Days to first male and female flower emergence

Among the application of organic manure the minimum days to first male flower emergence was seen in $T_7$ (FYM 50% + Poultry manure 50%) with 31.67 days, followed by $T_8$ (Poultry manure 50% + Vermicompost 50%) with 33.33 days whereas maximum days to first male flower emergence 35.67 days was recorded in $T_5$ (Vermicompost 75% + FYM 25%). Among the application of organic manure the minimum days to first female flower emergence was seen in $T_7$ (FYM 50% + Poultry manure 50%) with 40.00 days, followed by $T_8$ (Poultry manure 50% + Vermicompost 50%) with 41.67 days whereas maximum days to first female flower emergence 44.00 days was recorded in $T_5$ (Vermicompost 75% + FYM 25%). Integration of FYM and poultry manure favoured vigorous growth and synthesized more hormones in plants, which might have helped in the translocation as well as more quantity of available phosphorus through the xylem vessels and their accumulation in the axillary buds that would have favoured the plant to enter into reproductive phase. Similar results have also been reported by **Kaur and Kaur (2018); Tahir *et al.* (2019); Jagraj *et al.* (2020) and Singh *et al.* (2021)** in cucumber.

**4. Node at first male and female flower emergence**

Among the application of organic manure the maximum node at first male flower emergence was seen in $T_5$ (Vermicompost 75% + FYM 25%) at 4.11 node, followed by $T_4$ (Poultry manure 75% + Vermicompost 25%) with 3.89 node whereas minimum node at first male flower emergence 3.44 node was recorded in $T_4$ (FYM 75% + Vermicompost 25%). Among the application of organic manure the maximum node at first female flower emergence was seen in $T_5$ (Vermicompost 75% + FYM 25%) at 6.78 node, followed by $T_8$ (Poultry manure 50% + Vermicompost 50%) with 6.67 node whereas minimum node at first female flower emergence 6.00 node was recorded in $T_4$ (FYM 75% + Vermicompost 25%).

**5. Number of branches per plant**

It was also found that $T_8$ (Poultry manure 50% + Vermicmpost 50%) with maximum value i.e. 5.56 branches per plant followed by $T_6$ (Vermicompost 25% + Poultry manure 25%) with 4.89 branches per plant whereas the minimum score was observed in treatment $T_2$ (FYM 75% + Vermicompost 25%) with 4.22. It was noticed that number of branches per plant increased with increasing vine length successively with the increasing levels of nutrient. Combination of organic manures also recorded maximum vine length and number of branches also which helped the plants in better photosynthesis to attain vigour. The findings of the present investigation are in conformity with the reports of **Ikeh *et al.* (2012); Hamdi *et al.* (2017); Ghayal *et al.* (2018); Tahir *et al.* (2019) and Singh *et al.* (2021)** in cucumber.

**Table 1.1 Effect of organic treatment combination on seed germination, days to first male and female flower emergence**

| Treatment Notation | Treatment Combination | Seed Germination (%) | Days to first male flower emergence | Days to first female flower emergence |
|---|---|---|---|---|
| **T0** | **Control** | 79.17 | 34.00 | 42.33 |
| **T1** | FYM (75%) + Poultry manure (25%) | 70.83 | 34.67 | 43.00 |
| **T2** | FYM (75%) + Vermicompost (25%) | 79.17 | 34.33 | 42.67 |
| **T3** | Poultry manure (75%) + FYM (25%) | 72.92 | 35.00 | 43.33 |
| **T4** | Poultry manure (75%) Vermicompost (25%) | 91.67 | 33.33 | 41.67 |
| **T5** | Vermicompost (75%) + FYM (25%) | 75.00 | 35.67 | 44.00 |
| **T6** | Vermicompost (25%) + Poultry manure (25%) | 66.67 | 33.67 | 42.00 |
| **T7** | FYM (50%) + Poultry manure (50%) | 75.00 | 31.67 | 40.00 |
| **T8** | Poultry manure (50%) + vermicompost (50%) | 95.83 | 33.33 | 41.67 |
| **T9** | Vermicompost (50%) + FYM (50%) | 79.17 | 34.33 | 42.67 |
| | Mean | 78.54 | 34.00 | 42.33 |
| | 'F' Test | S | S | S |
| | C.V. | 0.29 | 0.21 | 0.48 |
| | S.E. (m) | 0.18 | 0.05 | 0.17 |
| | C.D. at 5% | 0.39 | 0.12 | 0.37 |

**Table 1.2 Effect of organic manure treatment combinations on vine length (cm) at 30, 45 and 60 DAS.**

| Treatment Notation | Treatment Combination | 30 DAS | 45 DAS | 60 DAS |
|---|---|---|---|---|
| **T0** | **Control** | 21.99 | 97.09 | 155.17 |
| **T1** | FYM (75%) + Poultry manure (25%) | 26.48 | 101.96 | 160.41 |
| **T2** | FYM (75%) + Vermicompost (25%) | 23.02 | 98.16 | 156.34 |
| **T3** | Poultry manure (75%) + FYM (25%) | 27.88 | 103.07 | 161.44 |
| **T4** | Poultry manure (75%) Vermicompost (25%) | 26.22 | 101.77 | 159.53 |
| **T5** | Vermicompost (75%) + FYM (25%) | 25.09 | 94.99 | 158.22 |
| **T6** | Vermicompost (25%) + Poultry manure (25%) | 29.02 | 98.80 | 162.19 |

| | | | | |
|---|---|---|---|---|
| **T7** | FYM (50%) + Poultry manure (50%) | 28.76 | 98.53 | 161.77 |
| **T8** | Poultry manure (50%) + vermicompost (50%) | 29.28 | 99.54 | 162.99 |
| **T9** | Vermicompost (50%) + FYM (50%) | 25.00 | 95.13 | 158.40 |
| | Mean | 26.27 | 98.90 | 159.64 |
| | 'F' Test | S | S | S |
| | C.V. | 0.24 | 0.11 | 0.08 |
| | S.E. (d) | 0.05 | 0.09 | 0.10 |
| | C.D. at 5% | 2.43 | 2.46 | 2.48 |

**Table 1.3 Effect of organic treatment combinations on node at first male and female flower and number of branches per plant.**

| **Treatment Notation** | **Treatment Combination** | Node at first male flower | Node at first female flower | Number of branches per plant |
|---|---|---|---|---|
| **T0** | **Control** | 3.78 | 6.67 | 4.22 |
| **T1** | FYM (75%) + Poultry manure (25%) | 3.89 | 6.33 | 4.56 |
| **T2** | FYM (75%) + Vermicompost (25%) | 3.44 | 6.00 | 4.22 |
| **T3** | Poultry manure (75%) + FYM (25%) | 3.78 | 6.33 | 4.33 |
| **T4** | Poultry manure (75%) Vermicompost (25%) | 3.89 | 6.22 | 4.44 |
| **T5** | Vermicompost (75%) + FYM (25%) | 4.11 | 6.78 | 5.33 |
| **T6** | Vermicompost (25%) + Poultry manure (25%) | 3.56 | 6.22 | 4.89 |
| **T7** | FYM (50%) + Poultry manure (50%) | 3.67 | 6.56 | 4.44 |
| **T8** | Poultry manure (50%) + vermicompost (50%) | 3.44 | 6.67 | 5.56 |
| **T9** | Vermicompost (50%) + FYM (50%) | 3.56 | 6.11 | 4.56 |
| | Mean | 3.71 | 6.38 | 4.65 |
| | 'F' Test | S | S | S |
| | C.V. | 1.86 | 0.39 | 0.17 |
| | S.E. (m) | 0.05 | 0.02 | 0.03 |
| | C.D. at 5% | 0.11 | 0.04 | 0.01 |

**B) Yield Parameters**

Yield parameters comprised of number of fruits per plant, fruit length, fruit diameter, fruit yield per plant, fruit yield per plot, fruit yield per hectare and T.S.S. The data for these characters observed has been listed out in table 1.4,.

**1. Number of fruits per plant**

The maximum number of fruits per plants 26.56 were recorded in treatment $T_8$ (Poultry manure 50% + Vermicompost 50%) followed by $T_9$ (Vermicompost 50% + FYM 50%) i.e., 23.33 and the lowest fruits per plant 15.78 were observed in $T_1$ (FYM 75% + Poultry manure 25%). Maximum number of fruits per plant increase of $T_8$ (Poultry manure 50% + Vermicompost 50%) might be due to increased number of flowers which might have formed into fruits due to adequate availability of major and minor nutrients during its growth and development. Similar conclusions have also been reported by **Ikeh *et al.* (2012); Hamdi *et al.* (2017); Singh *et al.* (2017); Ghayal *et al.* (2018); Tahir *et al.* (2019) and Singh *et al.* (2021)** in cucumber.

**2. Average fruit yield per plant, per plot and per hectare.**

The maximum fruit yield per plant 6.12 kg/plant were recorded in treatment $T_8$ (Poultry manure 50% + Vermicompost 50%) followed by $T_7$ (FYM 50% + Poultry manure 50%) i.e., 5.51 kg/plant and the lowest fruit yield per plant (3.69 kg/plant) was observed in $T_5$ (Vermicompost 75% + FYM 25%). The maximum fruit yield per plot 39.77 kg/plot were recorded in treatment $T_8$ (Poultry manure 50% + Vermicompost 50%) followed by $T_7$ (FYM 50% + Poultry manure 50%) i.e., 35.65 kg/plot and the lowest fruit yield per plot (23.77 kg/plot) was observed in $T_5$ (Vermicompost 75% + FYM 25%). The maximum fruit yield per hectare 15.90 t/ha were recorded in treatment $T_8$ (Poultry manure 50% + Vermicompost 50%) followed by $T_7$ (FYM 50% + Poultry manure 50%) i.e., 14.31 t/ha and the lowest fruit yield per hectare (10.11 t/ha) was observed in $T_5$ (Vermicompost 75% + FYM 25%). Organic manures play an important role in improving productivity and quality of fruit. Doses of Poultry manure, FYM and vermi-compost increased the vigour of plants, assimilating area, size of fruit, thereby resulting into higher weight of fruit. These results were in close conformity with the findings of **Ikeh *et al.* (2012); Hamdi *et al.* (2017); Singh *et al.* (2017); Ghayal *et al.* (2018); Tahir *et al.* (2019) and Singh *et al.* (2021)** in cucumber.

3. **Average fruit length and diameter**

The maximum fruit length 18.34 cm were recorded in treatment $T_8$ (Poultry manure 50% + Vermicompost 50%) followed by $T_9$ (Vermicompost 50% + FYM 50%) i.e., 17.94 cm and the lowest fruit length (16.42 cm) were observed in $T_5$ (Vermicompost 75% + FYM 25%). The maximum fruit diameter 7.29 cm were recorded in treatment $T_0$ (control) followed by $T_8$ (Poultry manure 50% + Vermicompost 50%) i.e., 6.80 cm and the lowest fruit diameter (5.67 cm) were observed in $T_7$ (FYM 50% + Poultry manure 50%). These results are in close conformity with the findings of **Ikeh *et al.* (2012); Hamdi *et al.* (2017); Singh *et al.* (2017); Ghayal *et al.* (2018); Kaur and Kaur (2018); Tahir *et al.* (2019) and Singh *et al.* (2021)** in cucumber.

4. **T.S.S.**

The maximum T.S.S. (5.77 $^0$Brix) was observed in treatment $T_8$ (Poultry manure 50% + vermicompost 50%) followed by $T_5$ (Vermicompost 75% + FYM 25%) with 5.70 $^0$Brix. The minimum T.S.S. (5.15 $^0$Brix) was noticed in treatment $T_4$ (Poultry manure 75% + Vermicompost 25%). These results are in close conformity with the findings of **Ikeh *et al.* (2012); Hamdi *et al.* (2017); Singh *et al.* (2017); Ghayal *et al.* (2018); Kaur and Kaur (2018); Tahir *et al.* (2019); Jagraj *et al.* (2020); Naseer *et al.* (2020) and Singh *et al.* (2021)** in cucumber.

**Table 1.4 Effect of organic treatment combinations on number of fruits per plant, fruit length, fruit diameter and T.S.S.**

| **Treatment Notation** | **Treatment Combination** | Number of fruits per plant | Fruit diameter (cm) | Fruit Length (cm) | T.S.S. |
|---|---|---|---|---|---|
| **T0** | **Control** | 18.11 | 7.29 | 17.67 | 5.42 |
| **T1** | FYM (75%) + Poultry manure (25%) | 15.78 | 6.35 | 17.73 | 5.35 |
| **T2** | FYM (75%) + Vermicompost (25%) | 17.67 | 6.79 | 16.78 | 5.42 |
| **T3** | Poultry manure (75%) + FYM (25%) | 21.00 | 6.11 | 17.00 | 5.30 |
| **T4** | Poultry manure (75%) Vermicompost (25%) | 20.89 | 6.63 | 16.75 | 5.15 |
| **T5** | Vermicompost (75%) + FYM (25%) | 23.33 | 5.69 | 16.42 | 5.70 |

| | | | | | |
|---|---|---|---|---|---|
| **T6** | Vermicompost (25%) + Poultry manure (25%) | 20.78 | 6.35 | 17.56 | 5.47 |
| **T7** | FYM (50%) + Poultry manure (50%) | 22.67 | 5.67 | 17.15 | 5.27 |
| **T8** | Poultry manure (50%) + vermicompost (50%) | 26.56 | 6.80 | 18.34 | 5.77 |
| **T9** | Vermicompost (50%) + FYM (50%) | 23.33 | 6.32 | 17.94 | 5.35 |
| | Mean | 23.33 | 6.40 | 17.33 | 5.42 |
| | 'F' Test | S | S | S | S |
| | C.V. | 0.18 | 0.14 | 0.06 | 6.32 |
| | S.E. (m) | 0.03 | 0.08 | 0.01 | 0.28 |
| | C.D. at 5% | 0.06 | 0.02 | 0.02 | 0.58 |

**Table 1.5 Effect of organic treatment combinations on Fruit yield per plant, fruit yield per plot and fruit yield per hectare**

| **Treatment Notation** | **Treatment Combination** | Fruit yield per plant (Kg/plant) | Fruit yield per hectare (t/ha) | Fruit yield per plot (Kg) |
|---|---|---|---|---|
| **T0** | **Control** | 3.88 | 10.32 | 24.31 |
| **T1** | FYM (75%) + Poultry manure (25%) | 3.60 | 9.62 | 22.46 |
| **T2** | FYM (75%) + Vermicompost (25%) | 3.84 | 10.22 | 24.03 |
| **T3** | Poultry manure (75%) + FYM (25%) | 4.51 | 11.97 | 28.60 |
| **T4** | Poultry manure (75%) Vermicompost (25%) | 4.79 | 12.68 | 30.44 |
| **T5** | Vermicompost (75%) + FYM (25%) | 3.69 | 10.11 | 23.77 |
| **T6** | Vermicompost (25%) + Poultry manure (25%) | 5.10 | 13.26 | 32.92 |
| **T7** | FYM (50%) + Poultry manure (50%) | 5.51 | 14.31 | 35.65 |
| **T8** | Poultry manure (50%) + vermicompost (50%) | 6.12 | 15.90 | 39.77 |
| **T9** | Vermicompost (50%) + FYM (50%) | 5.45 | 14.16 | 35.28 |
| | Mean | 4.65 | 12.25 | 29.72 |
| | 'F' Test | S | S | S |
| | C.V. | 1.98 | 1.87 | 0.66 |
| | S.E. (m) | 0.07 | 0.18 | 0.16 |
| | C.D. at 5% | 0.16 | 0.39 | 0.33 |

**C) Economic Parameter**

Maximum gross returns, net returns and benefit cost ratio was observed in the treatment $T_8$ (Poultry manure 50% + Vermicompost 50%) and recorded the best treatment among

all the other treatments. As the economics is the need of the farmers while taking decision regarding the adoption of the techniques and scientific knowledge hence, $T_8$ (Poultry manure 50% + Vermicompost 50%) gave the highest gross return, net return, and cost benefit is due to higher productivity and higher quality of fruits, which increase the market value of the fruits.

## CONCLUSION

From the present investigation it was concluded that $T_8$ (Poultry manure 50% + Vermicompost 50%) was found to be best among all treatment in terms of growth, yield and quality of cucumber i.e. T.S.S. The highest net return was found from $T_8$ (Polutry manure 50% + vermicompost 50%) with ₹1,56,775 and the B:C ratio that is 1.92.

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