International Journal of Plant & Soil Science

34(22): 299-309, 2022; Article no.IJPSS.90350
ISSN: 2320-7035

Effect of Organic Manures and Inorganic Fertilizers on Growth, Fruit Yield and Quality of Cherry Tomato (*Solanum lycopersicum* var. *cerasiforme*) c.v. Pusa Cherry Tomato-1 under Naturally Ventilated Polyhouse Condition

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/IJPSS/2022/v34i2231380

Open Peer Review History:
This journal follows the Advanced Open Peer Review policy. Identity of the Reviewers, Editor(s) and additional Reviewers, peer review comments, different versions of the manuscript, comments of the editors, etc are available here: https://www.sdiarticle5.com/review-history/90350

Original Research Article

Received 28 June 2022
Accepted 01 August 2022
Published 04 August 2022

ABSTRACT

The present investigation was carried out at Naturally Ventilated Polyhouse, Department of Horticulture, SHUATS, Prayagraj (U.P.) during winter season of 2021 - 2022, to evaluate the most suitable treatment combination of organic manures and inorganic fertilizers for growth, fruit yield and Quality of Cherry Tomato. The experiment was laid out in randomized block design with 13 treatments replicated thrice. The treatments consisted of different combinations of organic manures i.e., FYM (Farmyard Manure), Poultry manure and Vermicompost and inorganic fertilizers. Among thirteen treatments under study, treatment T3 100% Organic Manures (33% FYM+ 33% Poultry manure + 33% Vermicompost) recorded maximum plant height (235.20 cm), minimum days to first flowering (45.36), minimum days to 50% flowering (61.42), maximum number of branches per plant (11.33), maximum number of fruits per cluster (24.17), minimum days to first fruit setting (55.97), maximum number of cluster per plant (12.2), maximum average number of fruits per plant (237.53),

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maximum fruit set Percentage (86.65%),maximum fruit weight (13.25 g), maximum fruit width (3.04 cm), maximum fruit yield per plant (3.91 kg), maximum fruit yield per hectare (130.59 tonne), maximum TSS (10.64 Brix), maximum Juiciness (27%).Maximum number of flowers per cluster (29.33) was observed in T6(75% RDN + 25% Vermicompost), Maximum ascorbic acid content (24.57 mg/100 g) was observed in T11(25% RDN + 75% Poultry manure),Maximum B:C ratio was found in treatment T3 100% Organic Manures (33% FYM+ 33% Poultry manure + 33% Vermicompost), *i.e.,* (5.97).

Keywords: Cherry tomato; organic; yield and quality.

1. INTRODUCTION

Tomato (*Solanum lycopersicum*), also known as the Wolf peach and Love of Apple is one of the most popular vegetables grown all over the world. It is grown in small home garden and market garden for fresh consumption as well as processing purposes. Many population studies have established a link between dietary intake of tomatoes, a major source of the antioxidant lycopene, and a reduced risk of cancer and cardiovascular diseases [1]. Cherry tomato (*Solanum lycopersicum* var. *cerasiforme*) plants are one of the cultivars of tomato species. It has become, for many small farmers, a good alternative, for being rustic, productive, and marketable, besides tasting good.

India is second largest producer of vegetable next to China in the world. In India, in fiscal year 2021, the total production of vegetables was estimated to be at approximately 196.27 million metric tons [2]. These vegetables include potatoes, tomatoes, onions, eggplants and cabbages among others. As a leading producer of low-cost fruits and vegetables, the country had an enormous export market but the per capita availability of vegetables in India is as low as 160 gm as against the recommended 300 g per day by FAO.

Cherry tomato *(Solanum lycopersicum* var. *cerasiforme*) is a warm season crop and requires long growing periods to reap more harvests, it is the most promising crop under protected structures as a small variety of tomato and generally considered to be similar but not identical to the wild precursor of the domestic tomato. Cherry tomatoes are smaller in size (1.5-3.5cm in diameter),spherical to slightly oblong in shape, and usually red in colour [3]. It is becoming popular in the retail chains and marketed at a premium price compared to regular tomato. It is considered as an exotic vegetable, bringing new taste and appearance to dishes. Cherry tomato is a highly-priced culinary as well as it is an ornamental vegetable. Cherry tomatoes are normally much sweeter than large tomatoes. Cherry tomato is beneficial to human health due to its high content of antioxidant and anti- carcinogenic property, vitamin A and vitamin C, ascorbic acid, and phytochemical compounds, including lycopene, beta-carotene, flavonoids and many essential nutrients [4]. Cherry tomatoes can be used directly as raw vegetable and as well for preparing convenience foods such as sauce, soup, ketchup,curries, paste,rasam and sandwitch [5] but they are preferred as salad tomato to vegetable [6]. It is commonly referred to as garden tomato and becoming very popular to many small farmers, special gardeners and green house managers around the world [7] due to its higher commercial value compared to regular tomatoes [8,9,10]. Cherry tomatoes are determinate, semi-determinate, and indeterminate growth habit with long racemes and many fruits of intense colour and flavour and weighing between 10 and 30 g [11].

To improve the yield and quality of the produce, it is necessary to pay attention on the optimum balanced use of nutrients through fertilizer application. Tomato requires large quantities. of both organic and inorganic nutrients for its economic yields. Fertilizers play a key role in the production of both quantity and quality. of tomato. Tomato plants should be providing with adequate fertilizer, nitrogen, phosphorus and potassium are the main elements which affect growth, yield and quality of tomato plants [12]. On the contrary, organic manures are easily available to the growers and their price is lower than that of chemical fertilizers [13]. In addition, organic fertilizers improve higher growth, yield and quality of crops. They also contain essential macro and micronutrients, many vitamins, growth promoters and some beneficial microorganisms [14], Sreenivasa et al., 2010). Farmers apply various types of organic manures such as cowdung, poultry manure, goat manure, farmyard manure, compost, vermicompost, mustard oil cake, etc. for tomato production. Among these organic manures, cowdung @ 15

t/ha can play a key role in increasing growth and yield of tomato when it is applied in combination with chemical fertilizers [15]. Poultry manure also enriches the soils by enhancing the nutrient status and improving the structure of the soil [16]. Aside from the slow release of nutrients, organic fertilizers made from animal excreta or other agricultural wastes is usually used to improve the structure and stability of the soil as well as enhancing the yield and quality of the crop plants [17,18], Marzouka and Kassem, 2011. Various organic manures such as cow dung, compost, mustard oilcake (MOC), green manure and poultry manure are excellent source of organic matters commonly used for crop production [19,20]. The application of effective, eco- friendly organic manures along with inorganic fertilizers would be the optimum integrated nutrient management practices for higher yield, restores soil health keeping soil productive and sustainable. Keeping in view all the above factors, the present study aims at identifying the best treatment combinations of organic manures and inorganic fertilizers in terms of growth, yield, quality and economics of Cherry tomatoes.

2. MATERIALS AND METHODS

The experiment was conducted in the Naturally Ventilated Polyhouse, Department of Horticulture, Naini Agricultural Institute, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj (UP) during 2021-22. All the facilities necessary for cultivation, including labour were made available by the department.

The experiment was laid out in randomized block design (R.B.D.) with 3 replications. Cherry Tomato were planted in the polyhouse field at a spacing of 45 cm × 30 cm in plot of 1 m × 1 m size. Normal cultural practices and plant protection measures were followed during the cultivation process. The mean (maximum and minimum) temperature was 35.8°C and 6.7°C respectively, mean (maximum and minimum) relative humidity was 98 and 35. The experimental soil was sandy loam in texture, nearly neutral in soil reaction (pH 7.2), low in organic carbon (0.4%), available nitrogen (250 kg/ha), available phosphorus (135 kg/ha) and available potash (344 kg/ha). Cherry tomato seeds were sown in the month of October, 2021. The field beds were prepared and 30 days old seedlings were transplanted in the main field in the month of November 2021 with respective spacing and covered by soil. The observation regarding growth, yield and quality were recorded. The sources of fertilizers used in this treatment are Urea (46% Nitrogen), DAP (Di-Ammonium Phosphate consists of 18% Nitrogen and 46% Phosphorous, MOP (Muriate of Potash) consists of 60% potassium, FYM (Farmyard Manure) consists of 0.5% N, 0.2% P and 0.5% K, Poultry manure consists of 3.03% N, 2.63% P and 1.4% K, Vermicompost consist of 2-3% N, 1.55-2.25% P and 1.85-2.25% K.The data recorded during the course of investigation were subjected to statistical analysis as per method of analysis of variance Fisher (1950). The significance and non-significance of the treatment effect were judged with the help of 'f' value (variance ratio) was compared with the table value at 5% level of significance. If calculated value exceeded then the value, the effect of considered to be significant. The significant difference between the means was tested against the critical difference at 5% level of significance.

2.1 Chemical Analysis of Soil

Composite soil samples are collected randomly before the layout of experiment was laid so as to determine the soil properties initially. The soil samples are collected from 0-15 cm depth and were dried under shade, then powdered with the help of a wooden pestle and mortar then sieved through a 2 mm sieve and was then subjected to further analysis. The physical properties of soil were evaluated by using the Bouyoucos hydrometer method outlined by Bouyoucos [21] and for organic carbon by Wet method Walkely and Black [22]. Available nitrogen was estimated by alkaline permanganate method by Subbiah and Asija [23], available phosphorus by Clasen's Calorimeter method by Jackson [24], available potassium was determined by use of Flame Photometric method [25].

3. RESULTS AND DISCUSSION

3.1 Growth Parameters

The data on growth parameters in different treatment combinations was recorded in Table 1. The maximum plant height (55.14 cm) at 30 DAT was observed with treatment T3 100% Organic Manures (33% FYM + 33% Poultry manure + 33% Vermicompost) followed by T7 (50% RDN + 50% FYM) with 50.53 cm. Minimum plant height (43.14cm) was observed in T1 Control. At 60 DAT the highest plant height (83.40 cm) was recorded with treatment T3 100% Organic

Manures (33% FYM + 33% Poultry manure + 33% Vermicompost) followed by T_7 (50% RDN + 50% FYM) with 81.55cm. The minimum plant height (64.48 cm) was recorded in T_1 Control. At 90 DAT maximum plant height (168.98 cm) was observed in treatment T3 100% Organic Manures (33% FYM + 33% Poultry manure + 33% Vermicompost) followed by T_{11} (25% RDN + 75% Poultry manure) with 160.97cm. Minimum plant height was recorded in T_2 RDF (150: 100:50 kg/ha NPK) with 130.87cm. At 120 DAT the maximum plant height (235.20cm) was observed in treatment T3 100% Organic Manures (33% FYM + 33% Poultry manure + 33% Vermicompost) followed by T7 (50% RDN+ 50% FYM) with 216.64 cm. Minimum plant height was recorded in T5 (75% RDN + 25% Poultry manure) with 190.45cm.The organic manure applied in the form of FYM 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 Patil et al. [26] in tomato, Suge et al. [27] in brinjal.

The minimum days (45.36) for first flowering was observed in treatment T3 100% Organic Manures (33% FYM + 33% Poultry manure + 33% Vermicompost) followed by T7 (50% RDN+ 50% FYM) with 47.47 days. The maximum days (53.61) for first flowering was observed in T9 (50% RDN + 50% Vermicompost) while the other treatments were moderate in their flowering.The time taken to the first flower appearance is an important pre- requisite which decides the early fruit yield. The earliness to flowering in treatment T3 might be due to better translocation of nutrients to the aerial parts. Similar findings were reported by Prativa and Bhattarai [28] in tomato.

The minimum days (61.42) for 50% flowering was observed in T3 100% Organic Manures (33% FYM + 33% Poultry manure + 33% Vermicompost) followed by T4 (75% RDN + 25% FYM) and T13 (25% RDN + 25% FYM + 25% Poultry manure + 25% Vermicompost) with 62.14 days. The maximum days (68.17) for 50% flowering was observed in T5(75% RDN + 25% Poultry manure).It might be due to the effect of combined application of organic and inorganic sources of nutrients which increased metabolically active enzymes as well as production and translocation of the metabolites. The maximum number of flowers per cluster (29.33) was observed in treatment T6 (75% RDN + 25% Vermicompost) followed by T10 (25%RDN + 75% FYM), *i.e.*, (29.05). The minimum number of flowers per cluster (23.64) was noticed in T1(Control) while the other treatments are moderate in flower production. The maximum number of flowers per cluster in treatment T6 might be due to better availability of nutrients to the plant leading to the luxuriant vegetative growth and accumulation of more photosynthates and finally increasing flower production. Minimum number of flowers per cluster in T_1 might be due to unavailability of nutrients for its growth and development.

The maximum number of branches per plant (11.33) were observed in treatment T3 100% Organic Manures (33% FYM + 33% Poultry manure + 33% Vermicompost) followed by treatment T2 RDF (150: 100: 50 kg/ha NPK), *i.e.*, 10.89. The minimum number of branches per plant (8.33) was observed in T10(25% RDN + 75% FYM).Number of branches are the contributors of yield as they bear the leaves, which fix the carbon dioxide through photosynthetic mechanism. As far as tomato is concerned, the leaf production is an important phenomenon especially for all the developing fruits. The results of the study are similar with Siddaling et al. [29].

The maximum number of Fruits per cluster (24.17) was observed in treatment T_3 100% Organic manures (33% FYM + 33% Poultry manure + 33% Vermicompost) followed by T_2 RDF (150: 100: 50 kg/ha NPK), *i.e.*, (22.89). The minimum number of fruits per cluster (15.95) was observed in T_9 (50% RDN + 50% Vermicompost).Maximum number of fruits incase of T3 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. Minimum number of fruits per cluster in T_9 (50% RDN + 50% Vermicompost)/might be due to non-availability of nutrients during its development. Similar findings were reported by Rafi et al. [30] in tomato, Poul et al. [31] in tomato, Rodge and Yadlod [32] in tomato.

The maximum number of cluster per plant (12.2) was observed in T3 100% Organic Manures (33% FYM + 33% Poultry manure + 33% Vermicompost) followed by T7 (50% RDN + 50% FYM), *i.e,*11.38. The minimum number of cluster per plant (8.63) was observed in T1 Control.

Table 1. Effects of organic manures and inorganic fertilizers on growth parameters of cherry tomato c.v. pusa cherry tomato-1 recorded

Sr.	Treatment	Plant height (cm)				Days to 1st Flowering	Days to 50% Flowering	No. of Flowers/ Cluster	No. of Branches / Plant	No. of Fruits/ Cluster	No. of Cluster /Plant	Days to First Fruit Setting (DAT)
		30 DAT	60 DAT	90 DAT	120 DAT							
T1	Control	43.14	64.48	133.43	195.75	51.22	67.56	23.64	8.77	17.58	8.63	67.56
T2	RDF(150:100:50 kg/ha NPK)	45.70	73.55	130.87	203.72	47.94	65.75	27.02	10.89	22.88	9.16	59.28
T3	100%Organic Manures(33% FYM+ 33% Poultry manure+ 33% Vermicompost)	55.14	83.40	168.98	235.20	45.36	61.42	28.22	11.33	24.17	12.2	55.97
T4	75% RDN + 25% FYM	46.54	74.44	133.94	197.03	47.56	62.14	25.06	9.11	20.38	10.01	59.81
T5	75% RDN+ 25% Poultry manure	47.20	77.39	142.32	190.45	52.11	68.17	26.91	8.61	19.42	9.49	62.22
T6	75% RDN+ 25% Vermicompost	48.09	75.04	153.00	181.94	50.11	64.00	29.33	9.09	21.53	10.46	58.69
T7	50% RDN + 50% FYM	50.53	81.55	160.87	216.64	47.47	63.61	26.08	9.00	21.53	11.38	56.89
T8	50% RDN+ 50% Poultry manure	48.98	81.09	159.31	211.60	49.83	63.53	24.69	9.57	19.16	10.3	57.11
T9	50% RDN + 50% Vermicompost	49.08	79.94	148.36	213.96	53.61	67.11	23.65	9.50	15.95	8.87	62.31
T10	25% RDN + 75% FYM	45.24	68.72	141.73	200.61	50.86	67.56	29.05	8.33	19.29	9.55	62.39
T11	25% RDN+ 75% Poultry manure	43.59	79.40	160.97	188.61	48.47	65.75	28.91	9.34	20.8	9.9	65.75
T12	25% RDN + 75% Vermicompost	45.30	76.59	143.47	193.36	48.44	63.61	26.24	9.40	20.7	9.96	64.00
T13	25% RDN + 25% FYM + 25% Poultry manure + 25% Vermicompost	44.12	76.21	141.73	195.96	49.00	62.14	28.37	9.99	20.65	9.4	62.14
	F-test	S	S	S	S	S	S	S	S	S	S	S
	S.Ed (±)	3.15	3.64	10.52	12.50	0.68	0.59	1.24	0.80	0.71	0.529	0.82
	C.D. @ 5 %	6.51	7.50	21.71	25.81	1.41	1.23	3.61	1.65	2.07	1.54	1.68
	C.V.	8.20	5.84	8.73	7.58	1.69	1.12	8.03	10.34	6.06	9.21	1.64

Table 2. Effects of Organic manures and Inorganic fertilizers on yield parameters of Cherry Tomato c.v. Pusa Cherry Tomato-1

Sr.	Treatment	Fruit set Percentage	No. of Fruits/Plant	Weight (g)	Fruit Width (cm)	Yield (kg/plant)	Yield (t/ha)
T1	Control	74.17	151.74	11.80	2.37	1.8	60.03
T2	RDF(150:100:50 kg/ha NPK)	85.20	209.61	13.00	2.63	2.71	90.64
T3	100%Organic Manures(33% FYM+ 33% Poultry manure+ 33% Vermicompost)	86.65	237.53	13.25	3.04	3.91	130.59
T4	75% RDN + 25% FYM	81.48	184.28	12.80	2.76	2.62	87.26
T5	75% RDN+ 25% Poultry manure	72.18	205.92	12.90	2.57	2.39	79.56
T6	75% RDN+ 25% Vermicompost	73.89	194.28	12.75	2.50	2.87	95.97
T7	50% RDN + 50% FYM	83.58	225.20	13.15	3.00	3.22	107.41
T8	50% RDN+ 50% Poultry manure	77.72	206.21	12.50	2.69	2.47	82.43
T9	50% RDN + 50% Vermicompost	67.45	213.68	12.16	2.59	1.73	57.58
T10	25% RDN + 75% FYM	66.52	176.93	12.30	2.71	2.26	75.21
T11	25% RDN+ 75% Poultry manure	71.92	179.31	12.80	2.68	2.63	87.63
T12	25% RDN + 75% Vermicompost	78.9	204.00	13.00	2.50	2.69	89.81
T13	25% RDN + 25% FYM + 25% Poultry manure + 25% Vermicompost	73.89	184.30	12.90	2.44	2.5	83.40
	F-Test	S	S	S	S	S	S
	S.Ed (±)	4.73	18.06	0.45	0.14	0.23	7.54
	C.D. @ 5 %	13.82	37.27	1.31	0.28	0.66	22
	C.V.	10.73	11.17	6.15	6.24	15.05	15.05

The minimum number of days to first fruit setting (55.97) was observed in T3 100% Organic Manures (33% FYM + 33% Poultry manure + 33% Vermicompost) followed by T7 (50% RDN + 50% FYM), *i.e,* 56.89. The maximum number of days to first fruit setting (67.56) was observed in T1 Control.

3.2 Yield Parameters

The data on yield parameters in different treatment combinations was recorded in Table 2.

The maximum Fruit Set Percentage (86.65%) was observed in T3 100% Organic Manures (33% FYM + 33% Poultry Manure + 33% Vermicompost).The minimum fruit set percentage (66.52%) was observed in T10 (25% RDN + 75% FYM). Maximum number of fruits per plant (237.53) was observed in T3 100% Organic Manures (33% FYM + 33% Poultry Manure + 33% Vermicompost) followed by T7(50% RDN + 50% FYM), i.e, (225.20). The lowest number of fruits per plant (151.74) were observed in T1 Control.Maximum number of fruits in case of T3 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. Minimum number of fruits per plant in T1 Control might be due to non-availability of nutrients during its development. Similar findings were reported by Rafi et al. [30] in tomato, Poul et al. [31] in tomato, Rodge and Yadlod [32] in tomato.

The maximum average fruit weight (13.25 g) was observed in Treatment T3 100% Organic Manures (33% FYM + 33% Poultry Manure + 33% Vermicompost) followed by T7(50% RDN + 50% FYM), *i.e,* 13.15 g. The minimum average fruit weight (11.80 g) was recorded in T1 Control.Maximum average fruit weight in Treatment T3 might be due to maximum availability of nutrients during all the critical stages of crop growth and for better translocation of photosynthates from vegetative parts to aerial parts which in turn helped in accumulation of dry matter. Similar findings were reported by Singh et. al. [33] in chili.

The maximum average fruit width (3.04 cm) was observed in Treatment T3 100% Organic Manures (33% FYM + 33% Poultry Manure + 33% Vermicompost) followed by T7(50% RDN + 50% FYM), *i.e.*, 3cm. The minimum average fruit width (2.37cm) was recorded in T1 Control. The maximum yield per plant (3.91kg) was recorded in treatment T3 100% Organic Manures (33% FYM + 33% Poultry manure + 33% Vermi-compost) followed by treatment T7(50% RDN + 50% FYM) with 3.22 kg. The minimum yield per plant (1.73 kg) was recorded in case of T9 (50% RDN + 50% Vermicompost)**.**The increase yield per plant might be due to the increased growth and flower attributes which in turn lead to the increased photosynthetic activity and accumula-tion of photosynthates and dry matter production.

The maximum yield per hectare (130.59 t) was recorded in treatment T3 100% Organic Manures (33% FYM + 33% Poultry manure + 33% Vermicompost) followed by treatment T7(50% RDN + 50% FYM) with (107.41 t). The minimum yield per hectare (57.58 t) was observed in treatment T9 (50% RDN + 50% Vermicompost).The maximum yield per ha in treatment T3 might be due to increased yield per plant and per plot which might have increased total yield per ha. Similar findings were reported by Narayan et al. [34] in tomato and Suge et al. [27] in brinjal.

3.3 Quality Parameters

The data pertaining to quality parameters were recorded in Table 3. The maximum TSS (10.64 Brix) was observed in treatment T3 100% Organic Manures (33% FYM + 33% Poultry manure + 33% Vermicompost) followed by T7 (50% RDN + 50% FYM) with 9.95 Brix. The minimum TSS (8.07 Brix) was observed in treatment T1 Control.Maximum TSS in treatment T3 might be due to increased availability of major as well as minor nutrients especially nitrogen and potassium, because they play vital role in enhancing the quality. The minimum TSS in T1 Control might be due to lack of availability of nutrients. This finding were also reported by Patil et al. [26] in tomato, Krishna and Krishnappa [35] in tomato.

The highest Vitamin-c (24.57 mg/ 100 g) was observed in treatment T11 (25% RDN+ 75% Poultry manure) followed by treatment T13 (25% RDN + 25% FYM + 25% Poultry manure + 25% Vermicompost) with 24.07 mg/100 g. The lowest Vitamin-C (21.13 mg/ 100 g) was observed in treatment T2 RDF(150:100:50 kg/ha NPK). Maximum Vitamin-C content in treatment T11 might be due to increased availability of major as well as minor nutrients especially nitrogen and potassium, because they play vital role in enhancing fruit quality. Minimum Vitamin-C in T2 might be due to Maximum TSS content. This finding were reported by Singh et al. [33] in field grown tomatoes.

Fig. 1. Characteristics of different treatments of cherry tomato c.v. Pusa Cherry Tomato-1

The highest % of Juice (27.00) was observed in treatment T3 100% Organic Manures (33% FYM + 33% Poultry manure + 33% Vermicompost) followed by T5 (75% RDN + 25% Poultry manure) with 24.48%. The lowest % of juice was noticed in treatment T1 (Control) with 18.86 %.Increase in quality parameters like Juiciness (%) in treatment T3 100% Organic Manures (33% FYM + 33% Poultry manure + 33% Vermicompost) might be due to increased availability of major as well as minor nutrients especially nitrogen and potassium, as they play vital role in enhancing the fruit quality. The minimum % of juice in T1 Control might be due to lack of availability of sufficient nutrients. Similar findings were reported by Krishna and Krishnappa [35] in tomato.

3.4 Economics

In terms of Economics Maximum Benefit cost ratio, 5.97 was observed in treatment T3 100% Organic Manures (33% FYM + 33% Poultry manure + 33% Vermicompost) followed by T7 (50% RDN + 50% FYM) with 5.18 respectively, and minimum B. C ratio was observed in T9 (50% RDN + 50% Vermicompost) with 2.67.

Table 3. Effects of organic manures and inorganic fertilizers on TSS, Ascorbic acid and Juiciness % of cherry tomato c.v. pusa cherry tomato-1

Sr.	Treatment	TSS (Brix)	Ascorbic Acid (mg/100 g)	Juiciness (%)
T1	Control	8.07	23.07	18.86
T2	RDF(150:100:50 kg/ha NPK)	9.43	21.13	20.87
T3	100%Organic Manures(33% FYM+ 33% Poultry manure+ 33% Vermicompost)	10.64	22.54	27.00
T4	75% RDN + 25% FYM	9.28	21.89	21.27
T5	75% RDN+ 25% Poultry manure	9.37	22.15	24.48
T6	75% RDN+ 25% Vermicompost	9.59	22.4	23.26
T7	50% RDN + 50% FYM	9.95	21.5	24.47
T8	50% RDN+ 50% Poultry manure	9.73	21.7	24.39
T9	50% RDN + 50% Vermicompost	8.99	22.24	23.23
T10	25% RDN + 75% FYM	8.35	21.31	21.64
T11	25% RDN+ 75% Poultry manure	8.80	24.57	23.22
T12	25% RDN + 75% Vermicompost	9.29	23.84	23.42
T13	25% RDN + 25% FYM + 25% Poultry manure + 25% Vermicompost	9.14	24.07	22.82
	F-test	S	S	S
	S.Ed (±)	0.49	0.80	1.43
	C.D. @ 5 %	1.02	1.66	2.96
	C.V.	6.49	4.38	7.64

4. CONCLUSION

Based on the result of experiment, it may be concluded that the treatment T3 100% Organic Manures (33% FYM + 33% Poultry manure + 33% Vermicompost) was recorded the best among all the 13 treatments , in terms of growth , yield and quality parameters of Cherry tomato variety Pusa Cherry tomato-1. In terms of economics also, the Benefit Cost ratio (5.97) is found maximum in treatment T3.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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