Effect of organic manures, inorganic fertilizers and biofertilizers on growth parameters of guava (Psidium guajava L.) cv. Sardar in Mrig Bahar crop of sub humid agro ecological zon...
Effects of organic manures, inorganic fertilizers and biofertilizers on growth parameters of guava (Psidium guajava L.) cv. Sardar in Mrig Bahar crop of sub humid agro ecological zone of Rajasthan

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Abstract

A field experiment entitled “Effect of organic manures, inorganic fertilizers and biofertilizers on growth, yield and quality of Guava (Psidium guajava L.) cv. Sardar in Mrig Bahar Crop” was conducted during the May 2018 to February 2019, at the Fruit Instructional Farm, Department of Fruit Science, College of Horticulture and Forestry, Jhalawar. The experiment consisted of sixteen different treatments of organic manures, inorganic fertilizers and biofertilizers was laid out in Randomized Block Design with four replications. The results revealed that the treatment $T_{14}$ (75% RDF + 10 kg Vermicompost + 50 g Azotobacter + 50 g PSB + 5 kg mustard oil cake per plant) was found significantly superior over all other treatments with respect to plant growth characteristics including soil physicochemical properties.

Keywords: Guava, vermicompost, azotobacter, PSB, mustard oil cake and growth

Introduction

Guava (Psidium guajava L.) is one of the most important and commercially cultivated fruit crop belonging to the family Myrtaceae. It is one of the privileged fruits liked by the common masses and is aptly known as “apple of the tropics”. Guava is said to have originated in Tropical America (Hayes 1953) and it was introduced in India by the Portuguese during 17th century. Guava is classified under genus Psidium, which encompasses 150 species but only Psidium guajava has been exploited commercially in terms of commercial success. India is the leading producer of guava in the world and it shares about 45% of total production of guava in the world. The leading guava producing states in India are Madhya Pradesh, Uttar Pradesh, Maharashtra, Bihar, West Bengal, Gujarat and Karnataka (Anonymous, 2016). In Rajasthan state, guava is mainly grown in the districts of Sawai Madhopur, Kota, Baran, Tonk, Sirohi, Udaipur, Banswara and Jhalawar etc. Sawai-Madhopur is the leading guava producing district of Rajasthan state. The total area, production and productivity of guava in India is about 2.62 lakh hectare, 3648 metric tons and 13.7 metric tons per hectare, respectively. Uttar Pradesh is the leading guava producing state of the country with an area, production and productivity of 41000 hectare, 42.50 metric tons, and 10.37 metric tons per hectare, respectively, Guava fruit is a powerhouse of nutrients. Guava fruit has pleasantly sweet and refreshingly acidic in flavor and emits sweet and strong aroma. The fruit is an excellent source of ascorbic acid and pectin content but has low energy (66 cal/100g), protein (1%) and has 17% dry matter and 83% moisture. Since guava fruits possess immense nutritional value, its cultivation is gaining momentum in different parts of Rajasthan state.

Guava fruit has earned the popularity because of easy availability to common masses during the post-monsoon season. It is predominantly consumed as dessert fruit and also being used in various processed products being prepared from guava such as jam, jelly, cheese, puree, ice cream, canned fruit and RTS are prepared from ripe fruits of guava. Integration of organic manures with mineral fertilizers has positive effect on the physical, microbiological and chemical properties of soil, which is indirectly responsible for supporting growth and amenable development of plants. (Adak et al. 2012) [1].

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Materials and methods
The experiment “Effect of Organic manures, Inorganic fertilizers and Biofertilizer on Growth, Yield and Quality of Guava (Psidium guajava L.) cv. Sardar in Mrig Bahar Crop” was conducted during the year 2018-19, at the Fruit Instructional Farm, Department of Fruit Science, College of Horticulture and Forestry, Jhalawar. The guava orchard was planted during 2008 at 8 x 8 m spacing under square method of planting and soils are black vertisols having predominance of clay with abundant water holding capacity. Guava stands next to Nagpur mandarin as major fruit crop in Jhalawar district.

The treatments combinations applied are given as under:

| Treatments notation | Treatment contents |
|---------------------|--------------------|
| T0                  | Control            |
| T1                  | 100 % RDF (600 g N : 300 g P : 300 g K/ tree) + 10 kg Vermicompost |
| T2                  | 75 % RDF + 10 kg Vermicompost |
| T3                  | 50 % RDF + 10 kg Vermicompost |
| T4                  | 100 % RDF + 50 g Azotobacter |
| T5                  | 75 % RDF + 50 g Azotobacter |
| T6                  | 50 % RDF + 50 g Azotobacter |
| T7                  | 100 % RDF + 50 g PSB |
| T8                  | 75 % RDF + 50 g PSB |
| T9                  | 50 % RDF + 50 g PSB |
| T10                 | 100 % RDF + 5 kg Mustard oil cake |
| T11                 | 75 % RDF + 5 kg Mustard oil cake |
| T12                 | 50 % RDF + 5 kg Mustard oil cake |
| T13                 | 100 % RDF + 10 kg Vermicompost + 50 g Azotobacter + 50 g PSB + 5 kg Mustard oil cake |
| T14                 | 75 % RDF + 10 kg Vermicompost + 50 g Azotobacter + 50 g PSB + 5 kg Mustard oil cake |
| T15                 | 50 % RDF + 10 kg Vermicompost + 50 g Azotobacter + 50 g PSB + 5 kg Mustard oil cake |

The tree height of guava was measured using measuring tape from base to the apex of the trees. Trunk girth of guava trees was recorded using Vernier Callipers. Plant orientation EW and NS was measured with the help of measuring tape. Number of branches was counted visually on selected trunk from initiation to termination of experiment. The experiment was laid down in randomized block design with three replications. Soil physico - chemical parameters including soil pH, electrical conductivity (dSm⁻¹), organic carbon (%) and available NPK (kg ha⁻¹) were recorded at initiation of experiment and after completion of experiment. Soil pH was determined by using glass electrode pH meter (Jackson, 1973) [5], electrical conductivity of soil by using standard precision conductivity bridge (Jackson, 1973) [5], organic carbon content by Walkley and Black (1934) [20] wet digestion method, available Nitrogen (kg/ha) by using alkaline Potassium Permanganate method (Subbiah and Asija, 1956) [18], available soil Phosphorus (kg/ha) by Olsen et al., (1954) [13], available potassium content (kg/ha) by Flame Photometer (Metson, 1956) [14]. The data obtained during the experiment were subjected to statistical analysis using Fisher’s analysis of variance technique.

Results and discussion
1. Tree Height (m): The data calculated in table 1 reveals the cumulative increase in tree height of guava plants cv. Sardar under different treatment combinations. Data presented in table 1 exhibited that maximum plant height (5.08m) was recorded under T14 treatment after 90 days after manuring and it was found highly significant over all other treatments. Minimum tree height (3.37m) was recorded under control. Overall, treatment exhibited maximum increase in tree height at 30, 60 and 90 days after manuring application. The increase in tree height in response to differential treatments indicates vigour of guava plants.

2. Trunk Girth (cm): The data presented in table 2 indicates the cumulative increase in trunk girth of guava plants cv. Sardar under different treatment combinations during experimental duration. Data exhibited in table 2 revealed that maximum trunk girth (48.98 cm) after 90 days after manuring was measured under T14 treatment, it was found at par with T15 treatment and was found highly significant over all other treatments, minimum trunk girth (42.93cm) was obtained under control. Overall, treatment exhibited maximum increase in trunk girth at 30, 60 and 90 days after manuring. The increase in trunk girth in response to differential treatments indicates accumulation of carbohydrate bio-mass in the trunk girth of guava plants.

3. Tree Canopy Spread East-West (m): The perusal of data in table 3 indicates the cumulative increase in East-West spread (m) of guava plants cv. Sardar in response to application of different treatment. Data presented in table 4 envisaged that maximum E-W spread (4.94 m) was obtained under T14 treatment after 90 days after manuring was found at par with T15 treatment and was highly significant over all other treatments. Minimum E-W canopy spread (4.15cm) was recorded under control. Overall, treatment T15 exhibited maximum increase in E-W canopy spread at 30, 60 and 90 days after manuring. The increase in plant spread in response to differential treatments indicates manifestation of shoot and leaf vigour by nutrient uptake and accelerated photosynthesis under environmental condition.

4. Tree Canopy Spread North-South (m): The data presented in table 4 reveals the cumulative increase in North-South spread (m) of guava plant cv. Sardar in response to application of different treatments. It is obvious from the data in table 4 that maximum N-S spread (4.92m) was measured under T15 treatment at 90 days after manuring and it was found at par with T11, T12, T13 and T14 treatments. Minimum N-S canopy spread (4.01) was measured under control. Overall, treatment T15 exhibited maximum increase in tree canopy spread (N-S) at 30, 60 and 90 days after manuring. The increase in plant spread in response to differential treatments indicates manifestation of shoot and leaf vigour by nutrient uptake and accelerated photosynthesis under environmental condition.
5. Number of branches: The data calculated in table 5 indicates number of branches of guava cv. Sardar in Mrsig bahar crop in response to the effect of organic manures, inorganic fertilizers and biofertilizers during experimental duration. Data presented in table 5 reveals that maximum number of branches (13.25) at 90 DAM was found at par with T14 treatment and were found highly significant over all other treatments. Minimum number of branches (6.50) were recorded under control at 90 DAM. Overall, increase in the number of branches were also estimated in T14 treatment at 30, 60 and 90 days after manuring. The data represents numeric variation in number of branches of guava cv. Sardar in response to application of different treatments.

The higher vegetative growth (plant height and diameter of shoots) by Azotobacter under T14 treatment might be due to the growth promoting substances that improved P and N availability and thereby causing higher protein synthesis which resulted in improved morphological growth. Many plant-associated bacteria have the ability to produce the naturally occurring plant growth regulator indole-3-acetic acid which plays the most important role in plant growth promotion. The increase in vegetative growth could be attributed to the higher amount of nutrient mobilization and multi minerals availability through vermicompost supplementation as well as stimulation of growth stimulating substances excreted by earthworms in their casts. The overall better growth may be attributed to more synthesis of organic matter coupled by biofertilizers application along with incorporation of Azotobacter, PSB, mustard oil cake and inorganic fertilizers incorporation. This might be attributed as a result of holistic approach under Integrated Nutrient Management which perhaps leads to accentuation in soil microbial activity thereby leading to higher N-fixation and phosphate mobilization. The significantly better plant growth and development attributes obtained under T14 treatment could be attributed to the fact that there might be increased uptake of nutrients followed by improved source-sink ratio and concurrent release of nutrients along with plant hormones like auxins, gibberellins and cytokinins in the rhizosphere of guava plants.

### Soil parameters

The prime role of Vermicompost as a soil conditioner and PSB application is to improve the soil quality as well as make available phosphorous thereby promoting the plant growth by utilization of sustaining natural resources. The plant growth is most obvious characteristic for evaluation the phenotypic expression in terms of vigour and nutrient uptake index. The results showed the positive influence of combination of Vermicompost, Azotobacter and PSB in enhancement of better plant growth attributes as well as improved available N and K status of canopy rhizosphere soil of guava trees. The data on soil physico-chemical properties in guava cv. L - 49 orchard soils are presented in table 6. The data pertaining to the effect of Vermicompost + PSB treatments on soil physicochemical properties revealed that pH, electrical conductivity (EC) decreased and organic carbon (%), available N, P, K status was increased significantly under T14 treatment (75 % RDF +10 kg Vermicompost + 50 g Azotobactor + 50 g PSB + 5 kg Mustard oil cake). PSB in consonance which Vermicompost improved the absorption and use of P by guava plants and contributes plant growth by producing hormones and cytokinins. Vermicompost has very high porosity, aeration, drainage and water holding capacity and strong retention of nutrients. The results of present findings are in accordance with those of Dutta and Kundu 2012 [8] in mango cv. Himsagar, Singh et al., 2014 in mango, Hadole et al., 2015 [12] in Nagpur Mandarin, Dutta et al., 2016 [8] in mango cv. Himsagar, Poonia et al., 2018 in mango cv. Dashehari and Poonia et al., 2018 [16] in mango cv. Kesar.

### Table 1: Effect of organic manures, inorganic fertilizers and biofertilizers on tree height (m) of guava (Psidium guajava L.) cv. Sardar in Mrsig bahar crop at the 30, 60 and 90 days intervals.

| Treatments | 30 DAM | 60 DAM | 90 DAM |
|------------|--------|--------|--------|
| T0         | Control| 3.30   | 3.36   | 3.37   |
| T1         | 100 % RDF (600 g N : 300 g P : 300 g K / tree) + 10 kg Vermicompost | 4.11 | 4.16 | 4.21 |
| T2         | 75 % RDF + 10 kg Vermicompost | 4.14 | 4.21 | 4.51 |
| T3         | 50 % RDF + 10 kg Vermicompost | 4.02 | 4.11 | 4.24 |
| T4         | 100 % RDF + 50g Azotobacter | 3.42 | 3.50 | 3.54 |
| T5         | 75 % RDF + 50g Azotobacter | 3.64 | 3.66 | 3.70 |
| T6         | 50 % RDF + 50g Azotobacter | 3.68 | 3.70 | 3.74 |
| T7         | 100 % RDF + 50g PSB | 3.78 | 3.80 | 3.83 |
| T8         | 75 % RDF + 50g PSB | 4.27 | 4.30 | 4.34 |
| T9         | 50 % RDF + 50g PSB | 3.97 | 3.91 | 3.95 |
| T10        | 100 % RDF + 5 kg Mustard oil cake | 3.73 | 3.80 | 3.96 |
| T11        | 75 % RDF + 5 kg Mustard oil cake | 4.20 | 4.30 | 4.42 |
| T12        | 50 % RDF + 5 kg Mustard oil cake | 4.11 | 4.26 | 4.33 |
| T13        | 100 % RDF + 10 kg Vermicompost + 50 g AZB + 50 g PSB + 5 kg MOC | 4.35 | 4.43 | 4.52 |
| T14        | 75 % + 10 kg Vermicompost + 50 g AZB + 50 g PSB + 5 kg MOC | 4.73 | 4.87 | 5.08 |
| T15        | 50 % + 10 kg Vermicompost + 50 g AZB + 50 g PSB + 5 kg MOC | 4.54 | 4.66 | 4.77 |
| SEm (±)    | 0.09 | 0.09 | 0.09 |
| CD (5%)    | 0.28 | 0.26 | 0.27 |

* DAM = Days after manuring

### Table 2: Effect of organic manures, inorganic fertilizers and biofertilizers on trunk girth (cm) of guava (Psidium guajava L.) cv. Sardar in Mrsig bahar crop at the 30, 60 and 90 days intervals.

| Treatments | 30 DAM | 60 DAM | 90 DAM |
|------------|--------|--------|--------|
| T0         | Control| 42.57  | 42.78  | 42.93  |
| T1         | 100 % RDF (600 g N : 300 g P : 300 g K / tree) + 10 kg Vermicompost | 43.25 | 44.86 | 45.46 |
| T2         | 75 % RDF + 10 kg Vermicompost | 43.67 | 45.07 | 45.31 |
| T3         | 50 % RDF + 10 kg Vermicompost | 44.12 | 45.11 | 45.62 |

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Table 3: Effect of organic manures, inorganic fertilizers and biofertilizers on tree canopy spread E-W (m) of guava (*Psidium guajava* L.) cv. *Sardar* in *Mrig bahar* crop at the 30, 60 and 90 days intervals.

| Treatments | 30 DAM | 60 DAM | 90 DAM |
|------------|--------|--------|--------|
| T0         | Control | 4.12   | 4.13   | 4.15   |
| T1         | 100 % RDF (600 g N : 300 g P : 300 g K / tree) + 10 kg Vermicompost | 4.61   | 4.63   | 4.66   |
| T2         | 75 % RDF + 10 kg Vermicompost | 4.67   | 4.70   | 4.72   |
| T3         | 50 % RDF + 10 kg Vermicompost | 4.65   | 4.68   | 4.71   |
| T4         | 100 % RDF + 50 g Azotobacter | 4.21   | 4.24   | 4.26   |
| T5         | 75 % RDF + 50 g Azotobacter | 4.36   | 4.38   | 4.42   |
| T6         | 50 % RDF + 50 g Azotobacter | 4.34   | 4.37   | 4.40   |
| T7         | 100 % RDF + 50 g PSB | 4.47   | 4.50   | 4.53   |
| T8         | 75 % RDF + 50 g PSB | 4.55   | 4.58   | 4.61   |
| T9         | 50 % RDF + 50 g PSB | 4.54   | 4.56   | 4.58   |
| T10        | 100 % RDF + 5 kg Mustard oil cake | 4.63   | 4.65   | 4.68   |
| T11        | 75 % RDF + 5 kg Mustard oil cake | 4.74   | 4.68   | 4.81   |
| T12        | 50 % RDF + 5 kg Mustard oil cake | 4.77   | 4.74   | 4.75   |
| T13        | 100 % RDF + 10 kg Vermicompost + 50 g AZB + 50 g PSB + 5 kg MOC | 4.62   | 4.79   | 4.84   |
| T14        | 75 % RDF + 10 kg Vermicompost + 50 g AZB + 50 g PSB + 5 kg MOC | 4.78   | 4.96   | 4.90   |
| T15        | 50 % RDF + 10 kg Vermicompost + 50 g AZB + 50 g PSB + 5 kg MOC | 4.83   | 4.87   | 4.94   |
| SEm (t)    | 0.03   | 0.10   | 0.02   |
| CD (5%)    | 0.10   | 0.29   | 0.07   |

* DAM = Days after manuring

Table 4: Effect of organic manures, inorganic fertilizers and biofertilizers on tree canopy spread N-S (m) of guava (*Psidium guajava* L.) cv. *Sardar* in *Mrig bahar* crop at the 30, 60 and 90 days intervals.

| Treatments | 30 DAM | 60 DAM | 90 DAM |
|------------|--------|--------|--------|
| T0         | Control | 3.97   | 3.99   | 4.01   |
| T1         | 100 % RDF (600 g N : 300 g P : 300 g K / tree) + 10 kg Vermicompost | 4.54   | 4.57   | 4.60   |
| T2         | 75 % RDF + 10 kg Vermicompost | 4.61   | 4.64   | 4.69   |
| T3         | 50 % RDF + 10 kg Vermicompost | 4.58   | 4.62   | 4.67   |
| T4         | 100 % RDF + 50g Azotobacter | 4.13   | 4.16   | 4.19   |
| T5         | 75 % RDF + 50g Azotobacter | 4.24   | 4.27   | 4.31   |
| T6         | 50 % RDF + 50g Azotobacter | 4.43   | 4.26   | 4.29   |
| T7         | 100 % RDF + 50g PSB | 4.29   | 4.24   | 4.35   |
| T8         | 75 % RDF + 50g PSB | 4.33   | 4.38   | 4.42   |
| T9         | 50 % RDF + 50g PSB | 4.32   | 4.36   | 4.40   |
| T10        | 100 % RDF + 5 kg Mustard oil cake | 4.59   | 4.63   | 4.68   |
| T11        | 75 % RDF + 5 kg Mustard oil cake | 4.64   | 4.71   | 4.77   |
| T12        | 50 % RDF + 5 kg Mustard oil cake | 4.62   | 4.70   | 4.76   |
| T13        | 100 % RDF + 10 kg Vermicompost + 50 g AZB + 50 g PSB + 5 kg MOC | 4.69   | 4.74   | 4.81   |
| T14        | 75 % RDF + 10 kg Vermicompost + 50 g AZB + 50 g PSB + 5 kg MOC | 4.73   | 4.79   | 4.87   |
| T15        | 50 % RDF + 10 kg Vermicompost + 50 g AZB + 50 g PSB + 5 kg MOC | 4.76   | 4.83   | 4.92   |
| SEm (t)    | 0.04   | 0.08   | 0.06   |
| CD (5%)    | 0.14   | 0.24   | 0.18   |

* DAM = Days after manuring
Table 5: Effect of organic manures, inorganic fertilizers and biofertilizers on number of branches of guava (Psidium guajava L.) cv. Sardar in Mirg bahar crop at the 30, 60 and 90 days intervals.

| Treatments                                      | 30 DAM | 60 DAM | 90 DAM |
|------------------------------------------------|--------|--------|--------|
| Control                                        | 5.75   | 6.00   | 6.50   |
| T1 100 % RDF (600 g N : 300 g P : 300 g K / tree) + 10 kg Vermicompost | 7.00   | 7.50   | 8.25   |
| T2 75 % RDF + 10 kg Vermicompost               | 8.00   | 9.00   | 10.00  |
| T3 50 % RDF + 10 kg Vermicompost               | 7.50   | 8.25   | 9.25   |
| T4 100 % RDF + 50g Azotobacter                 | 6.50   | 6.75   | 7.75   |
| T5 75 % RDF + 50g Azotobacter                  | 6.25   | 6.75   | 8.25   |
| T6 50 % RDF + 50g Azotobacter                  | 6.25   | 7.00   | 8.00   |
| T7 100 % RDF + 50g PSB                         | 6.75   | 7.50   | 8.50   |
| T8 75 % RDF + 50g PSB                         | 7.25   | 8.25   | 9.50   |
| T9 50 % RDF + 50g PSB                         | 7.00   | 7.50   | 9.25   |
| T10 100 % RDF + 5 kg Mustard oil cake          | 7.50   | 8.50   | 9.50   |
| T11 75 % RDF + 5 kg Mustard oil cake           | 8.25   | 9.50   | 10.75  |
| T12 50 % RDF + 5 kg Mustard oil cake           | 8.00   | 9.00   | 9.87   |
| T13 100 % RDF + 10 kg Vermicompost + 50 g AZB + 50 g PSB + 5 kg MOC | 8.75 | 10.00 | 11.25 |
| T14 75 % RDF + 10 kg Vermicompost + 50 g AZB + 50 g PSB + 5 kg MOC | 9.75 | 11.25 | 13.25 |
| T15 50 % RDF + 10 kg Vermicompost + 50 g AZB + 50 g PSB + 5 kg MOC | 9.50 | 10.75 | 12.25 |

SEm (±) 0.33 0.39 0.68 CD (5%) 0.97 1.15 1.99
* DAM = Days after manuring

Table 6: Effect of Vermicompost and PSB on soil physico-chemical parameters of guava cv. L - 49 at the end of experiment (December 2018).

| Treatments | Soil parameters |
|------------|----------------|
| Initial values | pH | EC (dSm⁻¹) | OC (%) | N (kg ha⁻¹) | P (kg ha⁻¹) | K (kg ha⁻¹) |
| T0         | 7.80 | 0.63 | 0.40 | 321.25 | 32.10 | 301.20 |
| T1         | 7.60 | 0.60 | 0.42 | 322.10 | 32.99 | 302.60 |
| T2         | 7.58 | 0.58 | 0.44 | 322.80 | 33.46 | 303.70 |
| T3         | 7.52 | 0.57 | 0.43 | 322.84 | 33.61 | 303.80 |
| T4         | 7.53 | 0.56 | 0.45 | 322.91 | 33.71 | 303.85 |
| T5         | 7.48 | 0.57 | 0.47 | 322.97 | 33.76 | 304.00 |
| T6         | 7.52 | 0.55 | 0.45 | 323.01 | 34.06 | 304.80 |
| T7         | 7.50 | 0.52 | 0.46 | 323.07 | 34.16 | 305.10 |
| T8         | 7.49 | 0.51 | 0.48 | 323.12 | 34.36 | 305.15 |
| T9         | 7.47 | 0.53 | 0.47 | 323.17 | 34.46 | 305.25 |
| T10        | 7.45 | 0.50 | 0.52 | 323.25 | 34.66 | 305.30 |
| T11        | 7.46 | 0.48 | 0.51 | 323.33 | 34.82 | 305.60 |
| T12        | 7.43 | 0.52 | 0.53 | 323.60 | 34.87 | 305.70 |
| T13        | 7.44 | 0.47 | 0.55 | 324.02 | 35.36 | 305.95 |
| T14        | 7.44 | 0.45 | 0.53 | 324.75 | 35.46 | 306.01 |
| T15        | 7.43 | 0.46 | 0.54 | 324.79 | 35.56 | 306.70 |
| T16        | 7.45 | 0.44 | 0.56 | 325.02 | 35.67 | 307.00 |
| T17        | 7.43 | 0.42 | 0.57 | 325.06 | 35.72 | 307.24 |
| T18        | 7.31 | 0.38 | 0.64 | 327.52 | 37.07 | 310.72 |
| T19        | 7.32 | 0.39 | 0.62 | 326.36 | 36.64 | 310.12 |
| SEm (±)    | 0.04 | 0.01 | 0.01 | 0.64  | 0.27  | 0.35  |
| CD (5%)    | 0.11 | 0.03 | 0.02 | 1.81  | 0.75  | 0.99  |

*Initial values of soil health parameters were recorded at the time of initiation of experiment (July 2018).

Conclusion
The plant growth parameters study of guava cv. Sardar under application of different treatment combinations on Mirg bahar guava trees revealed that application of T14 treatment (75 % RDF + 10 kg Vermicompost + 50 g Azotobacter + 50 g PSB + 5 kg Mustard oil cake per plant) manifested better results in terms of increment in plant growth parameters particularly plant height, rootstock girth, scion girth, number of shoots/plant, number of nodes/plant and improvement in soil health particularly lowering down soil pH, EC and enhancement of soil organic carbon and available N, P, K status of guava rhizosphere soil as compared to other treatments.

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