Effect of different organic sources and biofertilizers on guava (Psidium guajava L.) cv. Allahabad safeda

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Abstract
An investigation was conducted at Regional Fruit Research Station, Vengurla of Maharashtra, India to standardize the organic nutrient with biofertilizers management protocol for guava. In this experiment, various organic sources along with various biofertilizers combinations were tested on seven year old guava cultivar Allahabad Safeda to study the effect on fruiting and yield. The result obtained showed higher flowering (92.33%) and TSS (10.37°B) by application of Vermicompost (30 kg/plant) + Azospirillum culture (250 g/tree) + PSB @ 250 g/tree. Maximum average weight of fruits (400.00 g), yield of fruits (29.60 kg/tree and 11.84 t/ha) and minimum acidity (0.19%) was recorded with Vermicompost (30 kg/plant) + Azospirillum culture (250 g/tree) + PSB @ 250 g/tree + Vermi wash foliar spray (dilution with water @ 1:1). Maximum number of fruits produced per plant (85.00 fruit/plant) was found from plant fertilized with FYM (30 kg/plant). From the present study, it can be concluded that addition of biofertilizers along with organic manures was more effective than use of organic manure alone in enhancing fruit growth and qualitative parameters in guava.

Keywords: Nutrients, guava, yield, quality

Introduction
Guava (Psidium guajava L.), the apple of tropics is one of the most common fruit crop in India. Since guava bears almost throughout the year, a proper dose of nutrient application is considered essential for maintaining the productivity and good health of the tree. Emphasis should be as much on improving fertilizer use efficiency as also on its productivity, profitability, sustainability and eco-friendliness. Therefore, without regular application of organic sources and biofertilizers is not possible to maintain and sustain productivity. Decline in soil health due to excessive dependence on chemical inputs left us with other option of utilizing biological inputs like biofertilizers have been sought to be one of the answers to restore the soil health apart from solving nutrition problem of plants. Biofertilizers are basically carrier-based microorganisms used for maintaining soil health. They play an important role in plant nutrition through dinitrogen fixation (nitrogen fixers) and transformation of different nutrients in available forms (e.g. phosphorus solubilizers) besides helping plants to survive under water-stressed situation. Use of organic manures has also been recommended in Mango (Munniswami, 1970) [6]. A poor supply of major nutrients seems to be the main cause of tree decline, low yields and poor fruit quality in guava (Kadam and Patil 1993, Shankar et al. 2002) [4, 13]. It was therefore considered worthwhile to study the effect of biofertilizer on fruit characteristics of guava.

Materials and Methods
The field experiment was laid out in randomized block design with three replications on eight year’s old plants of guava cv. Allahabad Safeda during 2017-2018 at Regional Fruit Research station, Vengurla, Dr. B.S.K.K.V., Dapoli 416 516, Maharashtra. In order to assess the effect of various treatments, all the trees were managed with uniform cultural practices as per the standard recommendations with respect to irrigation and plant protection measures. The treatment details are as follows. The observations on number of fruits per plant, fruit weight, Yield per plant were recorded at harvest stage. Quality parameters like total soluble solid (TSS) and titrable acidity content of ripen fruits were analyzed following the methods described by A.O.A.C. (1984). Experimental data were statistically analyzed following the analysis of variance method (Panse and Sukhatme, 1984) [7].

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The data on number of fruits are presented in Table 1. Maximum number of fruits (85.00/ tree) was recorded in the treatment T1 with application of 30 kg FYM per plant. FYM favoured mineralization of organic sources of nitrogen in the soil and also due to increased microbial activities which could have stimulated the nitrification process. A build up of nitrogen and organic carbon in soil with different organic sources and levels combined with biofertilizers has also been reported by Mishra et al. (2011) [5]. Similar types of results were also obtained by Patidar and Mali (2004) [8] and Dey et al. (2005) [2].

**Number of fruits per tree**

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Flowering (%)</th>
<th>Average fruit weight (g)</th>
<th>No. of fruits (fruits/tree)</th>
<th>Yield (kg/tree)</th>
<th>TSS (°B)</th>
<th>Acidity (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1</td>
<td>88.33</td>
<td>167.06</td>
<td>85.00</td>
<td>14.20</td>
<td>5.68</td>
<td>9.27</td>
</tr>
<tr>
<td>T2</td>
<td>80.00</td>
<td>259.68</td>
<td>62.00</td>
<td>16.10</td>
<td>6.44</td>
<td>10.23</td>
</tr>
<tr>
<td>T3</td>
<td>80.00</td>
<td>210.17</td>
<td>59.00</td>
<td>12.40</td>
<td>4.96</td>
<td>10.23</td>
</tr>
<tr>
<td>T4</td>
<td>92.33</td>
<td>361.11</td>
<td>72.00</td>
<td>26.00</td>
<td>10.10</td>
<td>10.37</td>
</tr>
<tr>
<td>T5</td>
<td>84.00</td>
<td>229.95</td>
<td>61.00</td>
<td>13.60</td>
<td>5.44</td>
<td>9.17</td>
</tr>
<tr>
<td>T6</td>
<td>71.67</td>
<td>400.00</td>
<td>74.00</td>
<td>29.60</td>
<td>11.84</td>
<td>10.20</td>
</tr>
<tr>
<td>T7</td>
<td>81.00</td>
<td>264.61</td>
<td>65.00</td>
<td>17.20</td>
<td>6.88</td>
<td>9.13</td>
</tr>
<tr>
<td>CD at 5%</td>
<td></td>
<td></td>
<td></td>
<td>3.20</td>
<td>1.02</td>
<td>0.35</td>
</tr>
</tbody>
</table>

These studies thus concluded that organic source along with biofertilizer when applied in integrated manner can be replaced with chemical fertilizers for increasing the yield, quality and nutrient status of guava.

**References**