Effect of organic nutrient management on soil properties and nutrient uptake in muskmelon (Cucumis melo L.) cv. GMM 3

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Abstract

An experiment entitled “Effect of organic nutrient management on soil properties and nutrient uptake in muskmelon (Cucumis melo L.) cv. GMM 3” was carried out during Summer-2017 at College of Horticulture, Sardarkrushinagar Dantiwada Agricultural University, Jagudan (Gujarat). In this investigation nine levels of organic nutrients were tested in the Randomized Block Design with three replications. Treatments were evaluated on the basis of soil properties nutrient uptake and. Application of organic nutrients significantly affected soil properties like available nitrogen, phosphorus, potassium, organic carbon and nutrient uptake after harvest. Different soil parameters viz., available nitrogen (213.36 kg/ha), phosphorus (42.01 kg/ha), potassium (308.71 kg/ha), organic carbon (0.33%), nitrogen uptake (49.00 kg/ha), phosphorus uptake (12.98 kg/ha) and potassium uptake (40.51 kg/ha) by plant were found maximum with treatment 50 per cent N from FYM + 50 per cent N from Poultry Manure + Biofertilizer (Azospirillium+PSB+KSM) + Trichoderma viride + Neem oil (T7).

Keywords: Biofertilizers, KSM, nutrients uptake, PSB and Trichoderma viride

Introduction

Musk melon (Cucumis melo L.) is a vine crop belongs to the family cucurbitaceae. It has great importance due to its short duration and high production potential as well as high nutritive value. To compensate the short supply and to mitigate recent price hike in inorganic fertilizers, use of indigenous and traditional sources of nutrients like farmyard manure, vermicompost, poultry manure, cakes etc. may be used. Use of organic manures and bio-fertilizers single or in combination not only helps to sustain crop yields but also play a key role in improving the physical, chemical and biological properties and also increases the efficiency of applied fertilizers (Singh and Biswas, 2000) [10]. The organic manures and bio-fertilizers reduce the leaching loss which resulted in increased availability of nutrients (N, P and K) for longer period and improves soil health.

Material and methods

A field experiment entitled “Effect of organic nutrient management on soil properties and nutrient uptake in muskmelon (Cucumis melo L.) cv. GMM 3” was carried out during summer-2017 at College of Horticulture, Sardarkrushinagar Dantiwada Agricultural University, Jagudan (Gujarat). Total nine levels of organic manure nutrients were tested i.e. 50% N from FYM + 50% N from poultry manure (T1), 50% N from Neem cake + 50% N from poultry manure (T2), 50% N from Castor cake + 50% N from poultry manure (T3), 50% N from FYM + 50% N from poultry manure + Azospirillum + PSB + KSM (T4), 50% N from Neem cake + 50% N from poultry manure + Azospirillum + PSB + KSM (T5), 50% N from Castor cake + 50% N from poultry manure + Azospirillum + PSB + KSM (T6), 50% N from FYM + 50% N from poultry manure + Azospirillum + PSB + KSM + Trichoderma viride + Neem oil (T7), 50% N from Neem cake + 50% N from poultry manure + Azospirillum + PSB + KSM + Trichoderma viride + Neem oil (T8), 50% N from Castor cake + 50% N from poultry manure + Azospirillum + PSB + KSM + Trichoderma viride + Neem oil (T9). All the treatments were applied at the time of field preparation. Observation for soil properties and nutrient uptake were recorded and the mean data were subjected to statistical analysis following analysis of variance technique (Panse and Sukhatme, 1985).
Results and Discussion

Data in Table 1 showed significant difference for nitrogen, phosphorus and potassium, organic carbon estimation from soil sample before planting and after harvesting (kg/ha) and nitrogen, phosphorus and potassium uptake from plant were recorded and presented as under.

Table 1: Effect of organic nutrient management on nutrient content of soil and nutrient uptake

<table>
<thead>
<tr>
<th>Organic nutrient (F)</th>
<th>Nitrogen content (kg/ha)</th>
<th>Phosphorus content (kg/ha)</th>
<th>Potassium content (kg/ha)</th>
<th>Organic carbon content (%)</th>
<th>Nitrogen uptake by plant (kg/ha)</th>
<th>Phosphorus uptake by plant (kg/ha)</th>
<th>Potassium uptake by plant (kg/ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Before planting</td>
<td></td>
<td></td>
<td></td>
<td>After harvesting</td>
<td></td>
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</tr>
<tr>
<td>T1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>185.00</td>
<td>36.00</td>
<td>270.00</td>
</tr>
<tr>
<td>T2</td>
<td>190.29</td>
<td>37.72</td>
<td>277.01</td>
<td>0.31</td>
<td>43.71</td>
<td>9.23</td>
<td>36.25</td>
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<tr>
<td>T3</td>
<td>188.70</td>
<td>37.26</td>
<td>274.67</td>
<td>0.31</td>
<td>42.42</td>
<td>8.97</td>
<td>35.37</td>
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<tr>
<td>T4</td>
<td>187.39</td>
<td>36.56</td>
<td>273.44</td>
<td>0.30</td>
<td>41.94</td>
<td>8.33</td>
<td>35.10</td>
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<td>T5</td>
<td>194.56</td>
<td>38.80</td>
<td>285.34</td>
<td>0.32</td>
<td>46.16</td>
<td>11.41</td>
<td>37.73</td>
</tr>
<tr>
<td>T6</td>
<td>194.08</td>
<td>38.45</td>
<td>284.31</td>
<td>0.32</td>
<td>45.49</td>
<td>10.81</td>
<td>37.66</td>
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<td>T7</td>
<td>192.52</td>
<td>38.17</td>
<td>282.37</td>
<td>0.32</td>
<td>44.94</td>
<td>10.61</td>
<td>37.60</td>
</tr>
<tr>
<td>T8</td>
<td>213.36</td>
<td>42.01</td>
<td>308.71</td>
<td>0.33</td>
<td>49.00</td>
<td>12.98</td>
<td>40.51</td>
</tr>
<tr>
<td>T9</td>
<td>211.60</td>
<td>41.45</td>
<td>306.84</td>
<td>0.33</td>
<td>48.44</td>
<td>12.89</td>
<td>40.17</td>
</tr>
</tbody>
</table>

Effect of organic nutrient management on nutrient content of soil

Significantly maximum nitrogen (213.36 kg/ha), phosphorus (42.01 kg/ha) and potassium (308.71 kg/ha) content was recorded in soil after harvesting with application of 50 per cent N from FYM + 50 per cent N from Poultry Manure + Biofertilizer (Azospirillum+PSB+KSM) + Trichoderma viride + Neem oil (T7), however it was statistically at par with treatment T8.in all three major nutrients. One of the ways of increasing the nutrient status is by boosting the soil nutrient content either with the use of organic manures such poultry manure, animal waste and use of compost. The use of manure application enhances soil productivity and found to be promising which might be due to the fact that it reduces the leaching losses which resulted in increased availability of nutrients (N, P and K) for longer period. These results are in conformity with the finding of Jambhulkar (1994) [5], John et al. (2004) [6] and Dauda et al. (2005) [4] in brinjal. Significantly maximum organic carbon (0.33 %) was recorded with application of 50 per cent N from FYM + 50 per cent N from Poultry Manure + Biofertilizer (Azospirillum + PSB + KSM) + Trichoderma viride + Neem oil (T7) and it was statistically at par with treatment T8. The organic manures observed to have contributed to the organic carbon content of the soil and improve the soil pH. These results are in conformity with the finding of Aliyu (2000) [2] in pepper and Olla et al. (2013) [7].

Effect of organic nutrient management on nutrient uptake

Significantly maximum nitrogen (49.00 kg/ha), phosphorus (12.98 kg/ha) and potassium uptake by plant (40.51 kg/ha) was recorded with application of 50 per cent N from FYM + 50 per cent N from Poultry Manure + Biofertilizer (Azospirillum+PSB+KSM)+ Trichoderma viride + Neem oil (T7) which was statistically at par with treatment T8. Combinational effect of organic manure and biofertilizers gives highest total nitrogen, phosphorus and potassium uptake. These results are in conformity with the findings of Shan-Fung et al. (2000) [9] in cucumber, Bindiya et al. (2012) [3] in gherkin and Alekar et al. (2015) [11] in pumpkin.

Conclusion

It can be concluded that for better availability of nitrogen, phosphorus, potassium, organic carbon in soil and nutrient uptake after harvest in muskmelon, it can be grown under application of 50 per cent N from FYM + 50 per cent N from poultry manure + Biofertilizer (Azospirillum+PSB+KSM)+ Trichoderma viride + Neem oil.

References