RECYCLING OF INDUSTRIAL SOLID WASTE, PRESSMUD AS A MANURE

J. Kannan* and M. Prasanthrajan**
Horticultural College and Research Institute,
Periyakulam-625 501, India

ABSTRACT

The solid wastes from the sugar industries like pressmud can be reutilized and recycled as organic manure. Among the vegetable crops, Lycopersicon esculentum is popular and also highly nutritious as it contains vitamin c and beta-carotenes. A field experiment was conducted with five different rates of pressmud at the rate of 3.75, 6.25, 12.5, 15 and 0 tonnes ha⁻¹ along with the recommended nitrogen, phosphorus and potassium (100: 70: 70 kg ha⁻¹) in the tomato crop variety PKM-1. Among the levels, 3.75 tonnes ha⁻¹ pressmud and recommended fertilizers level registered significantly higher Lycopersicon esculentum yield of 30.6 tonnes ha⁻¹ whereas plants applied with recommended level of NPK alone recorded 21.25 tonnes ha⁻¹ which was 44.14% increase over the control. As the application rates of pressmud increases, the yield of the crop was affected.

Pressmud is one of the byproduct of sugarmills, which constitute about 3 to 4 percent of the crushed canes. It contains more of organic matter along with the nutrient elements like nitrogen, phosphorus, potassium, calcium, magnesium, iron, zinc, manganese, copper etc in small quantities. Lycopersicon esculentum is a popular vegetable and can be used for both the fresh market and processing. It is highly nutritious and contains vitamin c and beta-carotenes. It is being cultivated all over India as one of the important vegetable. The recommendation of fertilizers for this crop is 100: 70: 70 kg ha⁻¹.

A field experiment was conducted at Horticultural College and Research Institute, Periyakulam with five rates of pressmud (collected freshly from the Rajshree Sugar Factory) along with the recommended nitrogen, phosphorus and potassium (100:70:70 Kg ha⁻¹), in the Lycopersicon esculentum crop variety PKM-1. The pressmud was applied just ten days before planting of the crop. This experiment was conducted to find out the optimum level of pressmud along with recommended levels of fertilizers for obtaining maximum yield under irrigated conditions.

Treatment particulars are given below:

T₁ – Recommended NPK and pressmud @ 3.75 tonnes ha⁻¹; T₂ – Recommended NPK and pressmud @ 6.25 tonnes ha⁻¹; T₃ – Recommended NPK and pressmud @ 12.5 tonnes ha⁻¹; T₄ – Recommended NPK and pressmud @ 15.0 tonnes ha⁻¹; T₅ – Control (Recommended NPK alone). The treatments were replicated four times.

The biometric observations like number of fruits per plant, number of branches per plant, plant height at final harvest and total yield per plot were noted down and statistically scrutinized. The chemical characteristics of the applied pressmud were estimated by standard procedures.

The chemical characteristics of the field soil and applied pressmud were estimated and are given below in Table 1. The biometric observations were noted down and statistically scrutinized (Table 2).

As per the statistical analysis, the application of pressmud @ 3.75 tonnes ha⁻¹ along with the recommended fertilizers level registered significantly higher tomato yield of 30.6 tonnes ha⁻¹ than control. This is in accordance with the results of Tiwari et al (1998) and Sharma

* Agricultural College and Research Institute, Madurai.
** Agricultural College and Research Institute, Coimbatore.

et al (1994). Continuous application of pressmud and nitrogenous fertilizer increased significantly the available soil nitrogen (Tiwari et al., 1998). Sharma et al (1994) found that the application of higher dose of nitrogen as 200 kg ha⁻¹ and phosphorus at the rate of 60-80 kg ha⁻¹ in tomato hybrids significantly improved the plant height and fruit characteristics.

Application of pressmud at the rate of 3.75 tonnes ha⁻¹ and 6.25 tonnes ha⁻¹ increased the number of fruits plant⁻¹. Trivedi et al (1995) observed that phosphatic fertilizers (22 kg ha⁻¹) applied in conjunction with pressmud (5 t ha⁻¹) significantly increased pod and haulm yield of groundnut as well as total phosphorus uptake and proved superior over farm yard manure. This is in confirmation with the reports of Rajukannu (1997) who reported that the pressmud could be a substitute for farm yard manure and acts as a good source of organic nutrients. Duraiswamy et al (1999) observed the highest fruit yield in crops supplied with organic fertilizers (Azospirillum + composted coirpith + farm yard manure) than those supplied with inorganic nitrogen. The number of fruits per plant and total yield of fruits were higher in T₄, having recommended NPK and pressmud @ 3.75 tonnes ha⁻¹ than other treatments. This is in accordance with the results of Rai et al., 1980, who reported that pressmud applied to sugarcane, along with N, P and K fertilizers significantly increased the yield of cane and also observed improvement in juice quality.

**CONCLUSION**

Application of pressmud @ 3.75 tonnes ha⁻¹ along with the recommended NPK, significantly increased the plant height, number of fruits and total yield of Lycopersicon esculentum variety PKM-1. Hence, the application of pressmud @ 3.75 tonnes ha⁻¹ along with the recommended NPK, may be recommended to the Lycopersicon esculentum crop growers.

### Table 1. The chemical characters of the pressmud and field soil.

<table>
<thead>
<tr>
<th>Name of the material</th>
<th>pH</th>
<th>EC dSm⁻¹</th>
<th>Organic carbon %</th>
<th>Total/Avail. nitrogen</th>
<th>Total/Avail. phosphorus</th>
<th>Total/Avail. potassium</th>
<th>C:N ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pressmud</td>
<td>5.9</td>
<td>5.8</td>
<td>18.3</td>
<td>Total-</td>
<td>Total-</td>
<td>Total-</td>
<td>24.2</td>
</tr>
<tr>
<td>Field soil</td>
<td>7.4</td>
<td>0.2</td>
<td>0.4</td>
<td>Avail-</td>
<td>Avail-</td>
<td>Avail-</td>
<td>-</td>
</tr>
</tbody>
</table>

The data indicates the mean of four replications.

### Table 2. Biometric observations of the tomato crop plants

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Number of fruits plant⁻¹</th>
<th>Number of branches plant⁻¹</th>
<th>Plant height at final harvest in cm</th>
<th>Yield in tonnes ha⁻¹</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1</td>
<td>26.50</td>
<td>5.00</td>
<td>45.08</td>
<td>30.63</td>
</tr>
<tr>
<td>T2</td>
<td>20.75</td>
<td>4.75</td>
<td>38.83</td>
<td>27.06</td>
</tr>
<tr>
<td>T3</td>
<td>18.50</td>
<td>3.75</td>
<td>34.35</td>
<td>24.81</td>
</tr>
<tr>
<td>T4</td>
<td>18.00</td>
<td>3.75</td>
<td>30.98</td>
<td>21.13</td>
</tr>
<tr>
<td>T5</td>
<td>18.5</td>
<td>3.50</td>
<td>33.45</td>
<td>21.25</td>
</tr>
<tr>
<td>SED</td>
<td>1.01</td>
<td>0.60</td>
<td>1.49</td>
<td>2.78</td>
</tr>
<tr>
<td>CD (.01)</td>
<td>3.08</td>
<td>1.84</td>
<td>4.54</td>
<td>8.49</td>
</tr>
</tbody>
</table>

Data indicate the mean of four replications.
REFERENCES
Duraiswamy R. et al. (1999) South Indian Hort, 47(1/6), 234-235.