Mango (*Mangifera indica* Linn.), was selected for the study as it is one of the most important fruits for all sections of people in India. It is considered as the national fruit of India. India is the leading producer of mango in the world. While in Andhra Pradesh it is grown in an area of 0.49 million ha with a production of 2.52 million tons in the year 2010 (Center for Monitoring Indian Economy, 2010). The productivity of mango in India and Andhra Pradesh is 5753 kg/ha and 5067 kg/ha, respectively (Center for Monitoring Indian Economy, 2010).

The area under mango is increasing rapidly owing to great demand for fresh fruits as well as processed products in the international market. Even though the area under mango is increasing rapidly, the pace of development is not appreciable. However, the greatest bottleneck in the expansion of area under fruits is the non-availability of genuine and quality planting materials in adequate quantity from reliable nurseries.

Healthy and good quality plant material is the foundation of successful fruit industry in the country (Reddy and Shukla, 2007). In view of growing importance of fruit crops, the demand for quality planting material has increased manifold throughout the country in the recent past. Synchronization and rapid seedling emergence are the commonly reported benefits of pre-sowing treatments on germination. In most of the fruit crops, rootstock influences the vigor, longevity, tree size, yield and quality (Mukherjee and Majumdar, 1963). The rootstock is a very vital component of a grafted plant and once the trees are grafted on a certain rootstock and planted in the orchard, it is not possible to change it without incurring losses. Therefore, the good rootstock should posses the qualities like high degree of compatibility with the scion variety, adaptable to the agro-climatic conditions of the proposed area, tolerant to salt, resistant to drought, endurant to frost, resistant to diseases and pests prevailing in the proposed area. So raising of good quality rootstocks is very important for future ambie.

To meet the ever rising market demand and to evolve a best technology for producing high quality mango planting material in a short period of time pre-sowing treatments are very important which will also regulate growth and vigor of the root stock. Organized research work in these lines of mango is not available and hence, the present research work has been designed.

**RESEARCH METHODS**

An experiment was carried out at Experimental Learning In
- Hands on Training Nurseries, Dr. Y. S. R. Horticultural University in India in 2010-11. The experiment was laid out in Factorial Randomized Block Design with twelve treatments by choosing two factors - seed material (whole nut and extracted kernel) and pre-sowing treatments (GA at 250 and 500 ppm; KNO₃ at 0.5 and 1%; water soaking and control).

Treatment details

T₁ – Whole nut pre-treated with GA at 250 ppm
T₂ – Whole nut pre-treated with GA at 500 ppm
T₃ – Whole nut pre-treated with KNO₃ at 0.5 %
T₄ – Whole nut pre-treated with KNO₃ at 1.0 %
T₅ – Whole nut soaked in water
T₆ – Control i.e., Whole nut without any treatment
T₇ – Extracted kernel pre-treated with GA at 250 ppm
T₈ – Extracted kernel pre-treated with GA at 500 ppm
T₉ – Extracted kernel pre-treated with KNO₃ at 0.5 %
T₁₀ – Extracted kernel pre-treated with KNO₃ at 1.0 %
T₁₁ – Extracted kernel soaked in water
T₁₂ – Control i.e., Extracted kernel without any treatment

Polythene bags of size 7 x 9 inches and 300 gauge thickness filled with 2/3rd of the potting mixture were used for sowing of mango stones. After pre-sowing treatment for 12 hours, mango stones were sown horizontally with the tip facing upwards and watered immediately after sowing and at regular intervals.

Observations were recorded on germination percentage, seedling height and diameter, number of leaves, internodal length, root length, vigor of seedling and vigor index at 60 days after sowing. All the observations were recorded by selecting five plants randomly from each replication.

The vigour of seedling was calculated using the following formula at 60 days of sowing (Kumar et al., 2007).

\[ \text{Vigour of seedling} = \text{Dry weight of the roostock} \times \text{germination percentage} \]

The vigour index was calculated using the following formula at 15 days interval (Rao et al., 2006).

\[ \text{Vigour index} = \frac{\text{Mean rootstock length} \times \text{Germination percentage}}{100} \]

### RESEARCH FINDINGS AND DISCUSSION

Pre-sowing treatment significantly influenced germination, growth, vigor and graft success of mango.

#### Germination characters:

The data on germination percentage by pre-sowing treatments in mango was presented in the Table 1, extracted kernel pre-treated with KNO₃ @ 0.5 per cent found to be sound integrated practice, where it recorded maximum germination percentage (64.00 %). The variation in germination in pre-sowing osmoprimed stones might be due to the simulative effect of KNO₃ on the stones as well as enhanced enzymatic process and suppression of inhibitors along with synthesis of RNA, which might had resulted in maximum germination percentage. These results are in conformity with the findings of Reddy and Khan (2001) in khirni, Rajamanickam et al. (2002) in amla and Shirol et al. (2005) in khirni.

#### Growth characters:

Extracted kernel pre-treated with KNO₃ @ 0.5 per cent recorded maximum seedling diameter, number of leaves and root length. Rapid accumulation of food materials in the tissue results in obtaining maximum seedling diameter (Table 1). The

### Table 1: Effect of pre-sowing treatments on germination and growth characters of mango cv. ALPHONSO

<table>
<thead>
<tr>
<th>Treatments (T)</th>
<th>Germination percentage (%) Mean</th>
<th>Seedling height (cm) Mean</th>
<th>Seedling diameter (mm) Mean</th>
<th>Number of leaves Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Whole nut</td>
<td>Extracted kernel</td>
<td>Whole nut</td>
<td>Extracted kernel</td>
</tr>
<tr>
<td>GA₃ @ 250ppm</td>
<td>50.00</td>
<td>56.00</td>
<td>53.00</td>
<td></td>
</tr>
<tr>
<td>GA₅ @ 500ppm</td>
<td>51.33</td>
<td>58.66</td>
<td>55.00</td>
<td></td>
</tr>
<tr>
<td>KNO₃ @ 0.5%</td>
<td>58.66</td>
<td>64.00</td>
<td>61.33</td>
<td></td>
</tr>
<tr>
<td>KNO₃ @ 1.0%</td>
<td>56.00</td>
<td>60.00</td>
<td>58.00</td>
<td></td>
</tr>
<tr>
<td>Water soaking</td>
<td>50.00</td>
<td>51.33</td>
<td>50.66¹</td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td>49.66</td>
<td>51.00</td>
<td>50.33³</td>
<td></td>
</tr>
<tr>
<td>S.E.</td>
<td>0.34</td>
<td>0.58</td>
<td>0.82</td>
<td></td>
</tr>
<tr>
<td>C.D. (P=0.05)</td>
<td>0.99</td>
<td>1.72</td>
<td>2.44</td>
<td></td>
</tr>
</tbody>
</table>

* indicates significance of value at P=0.05

Figures bearing same letters did not differ significantly.

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The increase in number of leaves might be due to the promotion of physiological processes and stimulatory action of KNO₃ to form new leaves at faster rate and accelerated translocation of food material in the tissue which created an ideal condition for development of new leaf primordia. The decrease in number of leaves per plant by GA₃ than KNO₃ might be due to the rapid rate of stem elongation which failed to keep pace with the availability and subsequent uptake of nutrients for development of new leaves. Similar results were reported by Bhambota and Kaul (1966) in citrus. These results are in conformity with the results reported by Padma and Reddy (1998) in mango.

Lower concentrations of KNO₃ had significantly increased root length (Fig. 1 and 2) which might be due to vigorous shoot growth of potassium nitrate had resulted in more production of photosynthates and their translocation through phloem to the root zone which might be responsible for improving root length. The increased root length with KNO₃ might also be probably due to an increase in oxidation of nicotinamide adenine dinucleotide phosphate during respiration at seed germination (Hendricks and Taylorson, 1975). Similar results were reported by Kumar et al. (1991) in guava and Rajamanickam et al. (2004) in amla.

Extracted kernel pre-treated with GA₃ @ 500 ppm recorded maximum seedling height and internodal length. Higher concentrations of GA₃ had significantly influenced the seedling height. The maximum seedling height with GA₃ might be attributed to the cell multiplication and cell elongation in the cambium tissue of the internodal region (Dohon and Walker, 1957). GA₃ at all the concentrations used in the study, resulted in longer shoots with long and thin internodes. The results are in conformity with grape fruit seedlings, that the

Table 2: Effect of pre-sowing treatments on seedling height and vigor characters of mango cv. ALPHONSO

<table>
<thead>
<tr>
<th>Treatments (T)</th>
<th>Seedling height (cm)</th>
<th>Internodal length (cm)</th>
<th>Vigor of seedling</th>
<th>Vigor index</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Whole nut</td>
<td>Extracted kernel</td>
<td>Mean</td>
<td>Whole nut</td>
</tr>
<tr>
<td>GA₃ @ 250 ppm</td>
<td>22.00</td>
<td>24.03</td>
<td>23.01¹</td>
<td>2.85</td>
</tr>
<tr>
<td>GA₃ @ 500 ppm</td>
<td>23.43</td>
<td>24.13</td>
<td>23.78¹</td>
<td>3.40</td>
</tr>
<tr>
<td>KNO₃ @ 0.5 %</td>
<td>20.93</td>
<td>23.70</td>
<td>22.31¹</td>
<td>2.65</td>
</tr>
<tr>
<td>KNO₃ @ 1.0 %</td>
<td>19.93</td>
<td>23.20</td>
<td>21.56¹</td>
<td>2.50</td>
</tr>
<tr>
<td>Water soaking</td>
<td>19.18</td>
<td>21.60</td>
<td>20.39¹</td>
<td>2.28</td>
</tr>
<tr>
<td>Control</td>
<td>18.70</td>
<td>20.12</td>
<td>19.41¹</td>
<td>1.10</td>
</tr>
<tr>
<td>Mean</td>
<td>20.70¹</td>
<td>22.84²</td>
<td>2.46³</td>
<td>3.02³</td>
</tr>
</tbody>
</table>

S.E. ±
S.E. ±

C.D. (P=0.05)
S.E. ±

F- test

* Significant at 5 % level; Figures bearing same letters did not differ significantly.

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Conclusion:

On the basis of the results, it could be concluded that, extracted kernel pre-treated with KNO₃ @ 0.5 per cent was found to be sound integrated practice.

The observations are based on the results of experiment conducted for only one season and, therefore, these results are suggestive and not conclusive. The findings obtained in the present investigations need further confirmation for final recommendations.

REFERENCES


WEBLIOGRAPHY