Abstract

The experiment to determine the effects of KNO$_3$ and urea in manipulating the harvesting time and increasing yield as well as quality of nine years old mango (Mangifera indica L.) cv. Amrapali plants was carried out at the BAU Germplasm Centre, Department of Horticulture, Bangladesh Agricultural University, Mymensingh during the period from September 2006 to July 2007. The five treatments included in the experiment were potassium nitrate at 4%, 6% and 8%; urea at 2% and 4% and the control (water spray). Foliar spraying of urea at 4% exhibited better performance in relation to terminal shoot length, number of leaves and leaf area and potassium nitrate at 4% gave superior results with respect to length and breadth of panicle and number of secondary branches per panicle compared to control. The plants sprayed with KNO$_3$ at 4% expressed earlier panicle appearance by 17 days as compared to delayed appearance of panicle in untreated control plants. The plants received KNO$_3$ at 4% produced the highest number of panicles per plant (220.67) whereas the control plants had the least number of panicles (107.67). Regardless of concentration, KNO$_3$ and urea manifested slightly earlier harvest (5 days) compared to control. Plants treated with KNO$_3$ at 4% noted the highest number of fruits per plant (136.67) compared to control (62.67). The treatment urea at 4% resulted in the biggest fruit (202.83g) and the control plants exhibited the smallest fruit (175.00g). Potassium nitrate at 4% gave maximum yield (23.14 kg/plant) as compared to minimum yield (9.12 kg/plant) in the control (water spray).

Keywords: Yield and quality of mango, foliar application, potassium nitrate, urea.

Introduction

So far as delicacy is concerned, mango (Mangifera indica L.) is considered to be the number one fruit of Bangladesh which is nutritionally superior and one of the most valuable fruits of the world. In Bangladesh, it occupies 51.012 thousand hectares of land and total production of mango is 242.605 thousand tons with an average yield of 4.75 tons per hectare (BBS, 2005), which is considerably a low yield mitigating the national demand. Irregular or erratic flowering, low fruit set as well as fruit retention leading to low yield and fruits of poor quality and short availability period are also the main problems in mango production. Spraying of
KNO₃ (6%) during September-October significantly increased the percentage of flowering shoots and the number of mixed panicle and vegetative shoots/auxiliary branches (Rojas et al., 1993). Foliar spraying of urea and KNO₃ significantly increased the flowering percentage of mango (Rajput and Singh, 1988; Catchpoole and Bally, 1993). Generally, KNO₃ gives better results in flowering and fruiting (Khattab et al., 2006). Application of KNO₃ advanced flowering and harvesting date, increased yields and reduced alternate bearing (Sergent et al., 1997). Sharma et al. (1990) obtained maximum number of fruits per plant and fruit weight of mango cv. Langra at Madhya Pradesh, India from the urea treatment. Gupta and Brahmachari (2004) found maximum yield using urea. Potassium nitrate concentrations especially in combination with urea gave better results for most of the flowering and yield parameters of ‘Tommy Atkins’ mango in Ethiopia (Yeshitela et al., 2005). The research regarding regulation of flowering and harvesting time, increasing yield and quality of mango using KNO₃ and urea is inadequate in Bangladesh. With these views, the present study was aimed at investigating the effects of KNO₃ and urea on harvesting time, yield as well as quality attributes of mango.

Materials and Method

The experiment was carried out at the BAU Germplasm Centre, Department of Horticulture, Bangladesh Agricultural University, Mymensingh which is located at 24° 26' latitude and 90° 15' longitude with an altitude of 8.3 m above the sea level during September 2006 to July 2007. Investigations related to bio-chemical analysis were carried out in the Department of Biochemistry of Bangladesh Agricultural University (BAU), Mymensingh. The cultivar Amrapali was used in the study. The age of the plants was 9 years at the initiation of experiment with a plant spacing of 5m x 5m. The experiment was laid out in a Randomized Complete Block Design (RCBD) with 3 replications. Six treatments viz. Potassium nitrate (KNO₃) at 4%, 6% and 8%; Urea at 2% and 4% and Control (water spray) were used in the study. The solutions of 4, 6% and 8% KNO₃ were prepared by dissolving 40, 60 and 80 g of KNO₃ into 1 litre of fresh water each with 3 drops of Tween 80. The urea solutions of 2 and 4% were prepared by dissolving 20 and 40 g of urea in 1 litre of fresh water each with 3 drops of Tween 80, respectively. The KNO₃ and urea solutions as per treatment were sprayed to the plants on 15 November 2006. The data of the following parameters were recorded: length of terminal shoot, number of leaves per terminal shoot, leaf area, length and breadth of panicle, number of secondary branches per panicle, date of first panicle appearance, number of panicles per plant at 10 day intervals, fruit set per panicle, number of fruits retained per panicle at 10 day intervals starting from pea stage up to harvest, date of harvest, number of fruits per plant, average fruit weight, fruit length, fruit breadth, fruit thickness, edible portion, stone pulp ratio, peel pulp ratio, yield, shelf life, TSS,
pH, titratable acidity, vitamin C, dry matter content, reducing sugar, non reducing sugar and total sugar content. The length, breadth and number leaves of ten randomly selected terminal shoots at flowering stage were measured and the average was worked out. Leaf area was measured for all the 50 leaves taking 5 from each of ten above selected shoots by a leaf area meter and expressed as square centimeter. The length and breadth of panicle and number of secondary branches per panicle of 10 randomly tagged panicles covering the whole tree was recorded and the average was worked out. Ten panicles were randomly selected from each treatment. The initial number of fruits of each panicle and the fruits to be retained per panicle was recorded at 10 day intervals starting from pea stage up to harvest were counted and the average was worked out. Ten randomly selected fruits from each plant were used for taking fruit characters and the average was measured. After harvest, ten randomly selected fruits were allowed to ripen at room temperature and fruit quality was determined using 10 fruits per tree. Total soluble solid (TSS) of 10 fully ripe fruits for each treatment was estimated by a hand refractometer and the average was worked out. The titratable acidity (Ranganna, 1979), vitamin C content (Plummer, 1971), reducing sugar content (Miller, 1972) and total sugar content (Jayaraman, 1981) of mango pulp were determined. The recorded data on different parameters of the experiment were tabulated and analyzed and the treatment means were separated by Least Significant Difference (LSD) test at 5 % level of significance.

Results and Discussion

Effects of KNO₃ and urea on leaf, shoot and panicle characters of mango

The treatments exhibited statistically more pronounced effects in terms of length of terminal shoot, number of leaves per terminal shoot, leaf area, panicle length, panicle breadth and number of secondary branches per panicle (Table 1). Both urea and KNO₃ caused an increase in the terminal shoot length when compared to control. The plants treated with urea at 4% demonstrated the longest terminal shoot with 12.73 cm which, was followed by KNO₃ at 4% (12.50 cm), urea at 2% (12.30 cm) and KNO₃ at 6% (11.07 cm) as against the shortest shoot in control plants (8.24 cm). Maximum number of leaves (13.37) was registered in the plants sprayed with urea at 4%, which was statistically identical to those of KNO₃ at 4% (12.89) and urea at 2% (11.37), whereas the lowest leaves were recorded in the plants treated with KNO₃ at 8% (7.10). Foliar spraying of urea at 4% resulted in the highest leaf area (60.08 cm²) as compared to the least leaf area with 38.53 cm² in control. Rajput and Singh (1988) also experienced a significant increase in vegetative growth in mango cv. Dashehari caused by urea. Spraying of both KNO₃ and urea solutions irrespective of concentration exhibited longer panicles as compared to the shorter panicles in the control. Foliar spraying of mango plants with KNO₃ at 4% noted the longest panicle (38.83 cm), which was
statistically identical to those of urea at 4% (36.43 cm) and KNO₃ at 6% (34.90 cm), compared to the shortest panicles (25.19 cm) in control plants. This result corroborates the findings of Sanyal et al., (1996) who reported that KNO₃ caused an increase in length of panicle in cultivars Himsagar and Langra. Dalal et al. (2005) also reported the highest panicle length. The widest panicle (31.87 cm) was obtained from the plants sprayed with KNO₃ at 4%. The control plants manifested the narrowest panicle (19.83 cm). Regardless of concentration, KNO₃ and urea expressed better performance with respect to number of secondary branches per panicle compared to control (water spray).

Table 1. Effects of KNO₃ and urea on leaf, shoot and panicle characters of mango.

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Length of terminal shoot (cm)</th>
<th>No. of leaves/terminal shoot</th>
<th>Leaf area (cm²)</th>
<th>Length of panicle (cm)</th>
<th>Breadth of panicle (cm)</th>
<th>No. of secondary branches/panicle</th>
</tr>
</thead>
<tbody>
<tr>
<td>KNO₃ at 4%</td>
<td>12.50</td>
<td>12.89</td>
<td>48.22</td>
<td>38.83</td>
<td>31.87</td>
<td>43.03</td>
</tr>
<tr>
<td>KNO₃ at 6%</td>
<td>11.07</td>
<td>8.37</td>
<td>44.83</td>
<td>34.90</td>
<td>24.33</td>
<td>39.20</td>
</tr>
<tr>
<td>KNO₃ at 8%</td>
<td>9.00</td>
<td>7.10</td>
<td>43.62</td>
<td>34.00</td>
<td>22.20</td>
<td>38.40</td>
</tr>
<tr>
<td>Urea at 2%</td>
<td>12.30</td>
<td>11.37</td>
<td>44.81</td>
<td>32.67</td>
<td>22.00</td>
<td>38.07</td>
</tr>
<tr>
<td>Urea at 4%</td>
<td>12.73</td>
<td>13.37</td>
<td>60.08</td>
<td>36.43</td>
<td>28.07</td>
<td>41.73</td>
</tr>
<tr>
<td>Control</td>
<td>8.24</td>
<td>10.95</td>
<td>38.53</td>
<td>25.19</td>
<td>19.83</td>
<td>28.50</td>
</tr>
<tr>
<td>CV (%)</td>
<td>8.21</td>
<td>8.15</td>
<td>6.69</td>
<td>5.24</td>
<td>7.44</td>
<td>4.99</td>
</tr>
<tr>
<td>LSD (0.05)</td>
<td>1.58</td>
<td>1.64</td>
<td>5.68</td>
<td>3.20</td>
<td>3.35</td>
<td>3.46</td>
</tr>
</tbody>
</table>

Effect of KNO₃ and urea on panicle appearance and number of panicles per plant

The first appearance of panicle ranged from 16 December 2006 to 2 January 2007 (Table 2). The treatment KNO₃ at 4% manifested earlier panicle appearance by 17 days as compared to the delayed appearance in control plants. The earlier appearance in KNO₃ treated plants might be due to the fact that KNO₃ acts as a bud dormancy breaking agent (Tongumpai et al., 1989). Earlier flowering in mango promoted by foliar spray of KNO₃, which promotes ethylene biosynthesis has also been reported by Mosqueda-Vazquez and Avila-Resendiz (1985). Dalal et al., (2005) claimed flowering earliness (27-30 days earlier) in mango cv. Pairy sprayed with potassium nitrate in Akola, Maharashtra, India. Sergent and Leal (1989) reported that flower emerged 21 days earlier than control when KNO₃ applied on 19 November which gives support to the present result. Marked significant differences at all dates of data record were registered in terms of number of panicles per plant due to different treatments (Table 1). The treatment KNO₃ at 4% produced the highest number of panicles (28) on 24 December 2006, when KNO₃ at 8% and the control did not produce any inflorescence. The plants received KNO₃ at 4% always produced the highest number of panicles per plant.
Table 2. Effects of KNO₃ and urea on appearance and number of panicles per plant of mango.

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Date of first appearance of panicle</th>
<th>Number of panicles emerged per plant at</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>24.12.06</td>
</tr>
<tr>
<td>KNO₃ at 4%</td>
<td>16.12.06</td>
<td>28.00</td>
</tr>
<tr>
<td>KNO₃ at 6%</td>
<td>23.12.06</td>
<td>2.00</td>
</tr>
<tr>
<td>KNO₃ at 8%</td>
<td>28.12.06</td>
<td>0.00</td>
</tr>
<tr>
<td>Urea at 2%</td>
<td>21.12.06</td>
<td>10.00</td>
</tr>
<tr>
<td>Urea at 4%</td>
<td>19.12.06</td>
<td>12.00</td>
</tr>
<tr>
<td>Control</td>
<td>02.01.07</td>
<td>0.00</td>
</tr>
<tr>
<td>CV (%)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>LSD (0.05)</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Table 3. Effects of KNO₃ and urea on fruit set and fruit retention per panicle.

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Fruit set per panicle</th>
<th>Number of fruits retained per panicle at</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>25.03.07</td>
<td>04.04.07</td>
</tr>
<tr>
<td>KNO₃ at 4%</td>
<td>17.27</td>
<td>12.00</td>
</tr>
<tr>
<td>KNO₃ at 6%</td>
<td>19.87</td>
<td>19.87</td>
</tr>
<tr>
<td>KNO₃ at 8%</td>
<td>8.50</td>
<td>8.50</td>
</tr>
<tr>
<td>Urea at 2%</td>
<td>12.50</td>
<td>9.43</td>
</tr>
<tr>
<td>Urea at 4%</td>
<td>16.09</td>
<td>12.80</td>
</tr>
<tr>
<td>Control</td>
<td>6.50</td>
<td>6.50</td>
</tr>
<tr>
<td>CV (%)</td>
<td>11.32</td>
<td>8.52</td>
</tr>
<tr>
<td>LSD (0.05)</td>
<td>2.77</td>
<td>1.78</td>
</tr>
</tbody>
</table>
Table 4. Effects of KNO₃ and urea on number of fruits per plant and fruit characters of mango.

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Date of harvest</th>
<th>Number of fruits per plant</th>
<th>Fruit</th>
<th>Edible portion (%)</th>
<th>Stone pulp ratio</th>
<th>Peel pulp ratio</th>
<th>Shelf Life</th>
</tr>
</thead>
<tbody>
<tr>
<td>KNO₃ at 4%</td>
<td>20.06.07</td>
<td>136.67</td>
<td>193.07</td>
<td>9.15</td>
<td>6.45</td>
<td>5.82</td>
<td>67.53</td>
</tr>
<tr>
<td>KNO₃ at 6%</td>
<td>20.06.07</td>
<td>105.00</td>
<td>184.47</td>
<td>9.09</td>
<td>6.34</td>
<td>5.72</td>
<td>66.83</td>
</tr>
<tr>
<td>KNO₃ at 8%</td>
<td>20.06.07</td>
<td>96.67</td>
<td>180.60</td>
<td>8.91</td>
<td>6.41</td>
<td>5.69</td>
<td>64.99</td>
</tr>
<tr>
<td>Urea at 2%</td>
<td>20.06.07</td>
<td>94.66</td>
<td>184.06</td>
<td>9.07</td>
<td>6.22</td>
<td>5.66</td>
<td>65.64</td>
</tr>
<tr>
<td>Urea at 4%</td>
<td>20.06.07</td>
<td>108.33</td>
<td>202.83</td>
<td>9.22</td>
<td>6.46</td>
<td>6.02</td>
<td>68.15</td>
</tr>
<tr>
<td>Control</td>
<td>25.06.07</td>
<td>62.67</td>
<td>175.00</td>
<td>8.75</td>
<td>6.32</td>
<td>5.54</td>
<td>64.78</td>
</tr>
<tr>
<td>CV (%)</td>
<td></td>
<td>7.08</td>
<td>4.43</td>
<td>6.64</td>
<td>5.64</td>
<td>4.47</td>
<td>3.16</td>
</tr>
<tr>
<td>LSD (0.05)</td>
<td></td>
<td>12.95</td>
<td>15.03</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
<td>0.03</td>
</tr>
</tbody>
</table>

NS: Not significant

Table 40. Effects of KNO₃ and urea on quality attributes of mango.

<table>
<thead>
<tr>
<th>Treatments</th>
<th>TSS (%)</th>
<th>pH</th>
<th>Tita-table acidity (%)</th>
<th>Vitamin C (mg/100g pulp)</th>
<th>Dry matter content (%)</th>
<th>Reducing sugar (%)</th>
<th>Non-reducing sugar (%)</th>
<th>Total sugar (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>KNO₃ at 4%</td>
<td>25.15</td>
<td>5.94</td>
<td>0.22</td>
<td>32.23</td>
<td>20.49</td>
<td>5.12</td>
<td>13.71</td>
<td>18.83</td>
</tr>
<tr>
<td>KNO₃ at 6%</td>
<td>23.55</td>
<td>5.99</td>
<td>0.21</td>
<td>31.97</td>
<td>19.21</td>
<td>5.22</td>
<td>13.72</td>
<td>18.94</td>
</tr>
<tr>
<td>KNO₃ at 8%</td>
<td>22.60</td>
<td>5.96</td>
<td>0.20</td>
<td>30.86</td>
<td>18.97</td>
<td>5.13</td>
<td>13.73</td>
<td>18.86</td>
</tr>
<tr>
<td>Urea at 2%</td>
<td>24.00</td>
<td>5.98</td>
<td>0.21</td>
<td>30.53</td>
<td>19.75</td>
<td>5.07</td>
<td>13.78</td>
<td>18.85</td>
</tr>
<tr>
<td>Urea at 4%</td>
<td>25.53</td>
<td>5.93</td>
<td>0.19</td>
<td>31.93</td>
<td>20.76</td>
<td>5.20</td>
<td>13.92</td>
<td>19.12</td>
</tr>
<tr>
<td>Control</td>
<td>23.20</td>
<td>6.02</td>
<td>0.23</td>
<td>28.07</td>
<td>17.54</td>
<td>4.77</td>
<td>12.76</td>
<td>17.53</td>
</tr>
<tr>
<td>CV (%)</td>
<td>4.21</td>
<td>6.47</td>
<td>5.43</td>
<td>2.67</td>
<td>5.21</td>
<td>2.30</td>
<td>2.84</td>
<td>2.61</td>
</tr>
<tr>
<td>LSD (0.05)</td>
<td>1.84</td>
<td>NS</td>
<td>0.02</td>
<td>1.50</td>
<td>1.84</td>
<td>0.21</td>
<td>0.70</td>
<td>0.88</td>
</tr>
</tbody>
</table>

NS: Not significant
and it was recorded with 220.67 per plant on 22 February 2007. On the contrary, the control plants produced the least number of panicles (107.67) on the same date. Foliar spraying of KNO₃ significantly increased the flowering percentage (Rajput and Singh, 1988; Catchpoole and Bally, 1993). Dalal et al. (2005) obtained the greatest number of panicles per mango tree cv. Pairy in Akola, India when sprayed with potassium nitrate.

**Effect of KNO₃ and urea on fruit set and fruit retention per panicle**

The treatments exerted profound significant influences on fruit set per panicle (Table 3). Maximum fruit set per panicle was recorded in the treatment KNO₃ at 6% (19.87) followed by KNO₃ at 4% (17.27) and urea at 4% (16.09), whereas minimum fruit set was noticed from the control (6.50) plants. The number of fruits per panicle always differed significantly among the chemical treatments (Table 3). The plants sprayed with KNO₃ at 6% manifested higher number of fruits per panicle starting from 25 March (19.87) up to 4 April (7.07) as compared to lower panicles both on 25 March (6.50) and 4 April (2.33) in control. From 14 April 2007 up to harvest, the treatment KNO₃ at 4% always had the highest number of fruits per panicle and at harvest, it was with a value of 1.63, which was followed by urea at 4% (1.37) as against the least fruits per panicle from the control plants (0.73). The higher fruit set and retention in KNO₃ at 4% has got similarity with the findings of Oosthuysie (1997) who observed the greatest increase in fruit retention of mango cv. Tommy Atkins due to single spraying of KNO₃ at 4%. Dalal et al. (2005) also reported the highest fruit set (2.08%) with potassium nitrate in mango cv. Pairy in Akola, Maharashtra, India. Khattab et al. (2006) claimed that KNO₃ at 4% had improved flowering and fruiting in mango cultivars Ewais and Sidik, in Giza, Egypt.

**Effect of KNO₃ and urea on date of harvest, number of fruits per plant, fruit characters and yield**

The harvest time varied from 20.06.07 to 25.06.07 where urea and KNO₃ irrespective of concentration demonstrated slightly earlier harvest as compared to delayed harvest in control plants (Table 4). Mosqueda-Vazquez and Avila-Resendiz (1985) and Sergent et al. (1997) opined that foliar spraying of KNO₃ advanced harvesting date. The number of fruits per plant, fruit weight, stone pulp ratio, peel pulp ratio, yield and shelf life, were significantly influenced by the treatments (Table 4) although no significant variations were noted in fruit length, fruit breadth, fruit thickness and edible portion. The plants treated with KNO₃ at 4% produced the highest number of fruits per plant (136.67). The second highest number of fruits (108.33) per plant was appeared in the treatment urea at 4% followed by KNO₃ at 6% (105.00) compared to control (62.67) the least. Plants treated with urea at 4% recorded maximum fruit weight (202.83g) which was statistically at par to that of KNO₃ at 4% (193.07 g). The control plants exhibited minimum fruit weight (175.00g). These results are very close to the findings of
Sharma et al. (1990) who reported maximum fruit weight (174.9 g) with 4% urea treatment followed by the 3% KNO₃ treatment. Gupta and Brahmachari (2004) also obtained the highest fruit size, fruit weight and yield with spraying of urea at 4% at Bihar, India corroborate the findings of current study. The least stone pulp ratio was obtained from the plants treated with urea at 4% (0.25) followed by KNO₃ at 4% (0.27) and KNO₃ at 6% (0.27) as compared to the highest ratio (0.29) in control. The variation in peel pulp ratio was found narrow from 0.22 to 0.25. The treatments urea at 4%, KNO₃ at 4% and KNO₃ at 6% demonstrated the same but least peel pulp ratio (0.22) as against the highest ratio in control (0.25). Regardless of concentration, all the treatments favourably increased the yield compared to control. The treatment KNO₃ at 4% recorded the maximum yield of 23.14 kg/plant. The plants sprayed with urea at 4% showed the second highest yield (19.97 kg/plant) followed by KNO₃ at 6% (18.55 kg/plant) as compared to the lowest yield 9.12 kg/plant in control. The results of the present investigation are in agreement with the findings of Oosthuyse (1997) who indicated that KNO₃ sprayed at 2 or 4% increased yield correspondent with the greatest increase in fruit retention. The highest fruit yield due to spraying of potassium nitrate in mango cv. Pairy in Akola, Maharashtra, India (Dalal et al., 2005) has got the similarity with the present result. Jain (2006) indicated that single and double spray treatment with 4% urea gave maximum yield in Madhya Pradesh, India. The plants treated with 4% urea solution exhibited the highest shelf life (10.33 days) which was closely followed by KNO₃ at 4% (10.00 days), and KNO₃ at 6% (9.30 days), while the lowest shelf life (7.67 days) was noticed in the control plants. Irrespective of concentration, both urea and potassium nitrate manifested a marked increase in shelf life when compared with the plants under control.

Fig. 1. Effect of KNO₃ and urea on the yield per plant of mango. (Vertical bar represents LSD at 5% level).
Effects of KNO₃ and urea on qualitative characters of mango

The treatments exhibited significant variations with respect to TSS, titratable acidity, vitamin C, dry matter content, reducing sugar, non reducing sugar and total sugar content except pH, where no significant variation among the treatments was observed (Table 5). Urea solution at 4% recorded the maximum TSS content (25.53%) which was followed by KNO₃ at 4% (25.15%) and urea at 2% (24.00%) as against the least TSS content in plants treated with KNO₃ at 8% (22.60%). The minimum value of titratable acidity was observed in the treatment urea at 4% (0.19%) and the maximum (0.23%) in control plants. In general, both KNO₃ and urea registered statistically similar but higher vitamin C content compared to control. The treatment KNO₃ at 4% exhibited maximum vitamin C content (32.23 mg/100g pulp). On the contrary, the control plants recorded the least vitamin C content (28.07 mg/100g pulp). Plants spraying with urea at 4% exhibited the highest dry matter content (20.76%) as against the lowest dry matter content in the control (17.54%). Both urea and potassium nitrate irrespective of concentration recorded statistically similar and higher reducing and non reducing sugar content as compared to control. In general, both KNO₃ and urea registered higher total sugar content as compared to the lowest content in control. The treatment urea at 4% produced maximum total sugar content (19.12%), whereas the control treatment manifested the lowest (17.53 %) sugar content. The results of the investigation lend support to the findings of Rajput and Singh (1988) who found significant increase in fruit quality due to foliar spraying of urea. Ghosh and Chattopadhyay (1999) indicated that plants treated with 5% urea, however increased fruit size and weight, TSS, the contents of ascorbic acid, reducing and total sugars in the fruits and also decreased fruit acidity which is identical to the present results.

Conclusion

Foliar application of 4% KNO₃ or 4% urea had little effect on the manipulation of harvesting time but both of these two chemicals at the same concentrations improved the yield as well as quality attributes of mango fruit.

References


