PERFORMANCE OF DIFFERENT SWEET ORANGE VARIETIES UNDER FAISALABAD CONDITIONS

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ABSTRACT

The performance of eight sweet orange, Citrus sinensis Osbeck, varieties was evaluated at Horticultural Research Institute, AARI, Faisalabad, Pakistan during 2006-2008. At least ten plants of each variety were selected in the progeny garden. At the maturity physiochemical analysis of fruit of these plants was carried out. The varieties included were; Tarocco, Sanguinello, Moro, Blood Red, Musambi, Mars Early, Salustiana and Valencia Late. On the basis of two year means, the maximum fruit weight (253.67 g) and size (51.25 cm²) was recorded in Salustiana, maximum juice percentage (56.72) in Valencia Late and minimum acidity (0.28%) was recorded in Musambi. Minimum number of seeds per fruit (1.33) was recorded in Salustiana and maximum number of fruits per plant (450.67) was recorded in Valencia Late. In view of the quality characters and yield, varieties Salustiana, Musambi, Tarocco and Mars Early can be planted in Faisalabad region.

KEYWORDS: Sweet orange; cultivars; chemicophysical properties; Faisalabad; Pakistan.

INTRODUCTION

Citrus is a major fruit crop of the country both in area and production. These fruits are grown on an area of 199.36 thousand hectares with a production of 2294.4 thousand tons. In Punjab, it is grown on an area of 189.17 thousand hectares with annual production of 2219.32 thousand tons and is contributing 94.88 percent in area and 96.72 percent in production (1). These fruits carry special significance in view of their nutritional, therapeutic and economic values. Their richness in ascorbic acid (vitamin C and many other mineral substances), iron, calcium, phosphorus, magnesium and potassium, is very well recognized. Sweet orange (Citrus sinensis Osbeck) belongs to Rutaceae family. Orange fruit is commonly used as desert, apart from the aforesaid...
qualities; several products can be prepared from citrus fruits particularly the canned juices, canned sections, essential oils, soft drinks, candies, pickles, juice concentrates and citrus pulp. Dried sweet orange peel is used as additive in sweet dishes and to treat coughs.

Economically these fruits have attained ever-increasing significance from export point of view. Establishment of grading plants and processing units has enabled us render maximum volumes of good quality fruits for export purposes to boost our agro-based foreign exchange earnings. Besides Pakistan’s exclusive monopoly over Kinnow production, the oranges are the next focus crop and has export potential for Middle East, Far East and European countries.

There are many varieties and cultivars of sweet orange which differ in quality characters in changing the specific environment (4, 5, 11). Effect of rootstock on scion (6, 8, 9) fruits of different sweet orange varieties also showed diversity. The present study was aimed to find out the best varieties of sweet orange having more yield and better quality with good commercial value suited to conditions of Faisalabad.

**MATERIALS AND METHODS**

Eight varieties of sweet orange i.e. Tarocco, Sanguinello, Moro, Musambi, Blood Red, Mars Early, Salustiana and Valencia Late were evaluated at Horticultural Research Institute, AARI, Faisalabad, Pakistan during 2006-07 and 2007-08 under local conditions. Ten years old plants of each variety, budded on Rough lemon (Citrus jambheri) were selected as experimental material. Experiment was laid out in RCBD with three replications. The plants were protected against attack of insects, pests and diseases. Considering maturity time, fruits of different varieties were harvested at different times i.e. Musambi on 15th December; Tarocco, Blood Red and Moro on 15th January; Sanguinello and Salustiana on 15th February and Mars Early and Valencia Late at the end of February. Physicochemical analysis of fruit of these varieties was carried out in the laboratory.

All plants were given the standard cultural practices. The plants were watered by modified basin system. NPK @ 1500-750-500 g alongwith 60 kg FYM per plant were applied during study period. Nitrogen was applied in three split doses i.e. before flowering, at pea stage and during August, 2006 and 2007.

Ten fruits per plant of each variety were picked randomly during December to March, to determine fruit weight (g), fruit size (cm$^2$), peel thickness, peel
Performance of sweet orange varieties

percentage, juice percentage, total soluble solids (TSS), acidity percentage, number of seeds per fruit and number of fruits per plant. The TSS was measured by digital refractometer model PAL-1, ATAGO and the acidity was measured by fruit acidity meter model GMK-835F, G-Won.

Means of two years data were worked out and analyzed statistically by using the Fishers analysis of variance and treatments were compared by using the least significant difference (LSD) test at 5 percent probability level (10).

RESULTS AND DISCUSSION

The results (Table) revealed that significantly maximum fruit weight (253.67 g) was recorded in Salustiana followed by Mars Early, Valencia. Late and Tarocco having fruit weight of 224.67, 205.33 and 180.0 g, respectively. Minimum fruit weight (143.33 g) was noted in Moro. Maximum size (51.25 cm²) was also recorded in Salustiana while minimum in Moro (35.59 cm²). The results are in conformity with Aslam et al. (3) and Muhammad et al. (7).

Table. Physico-chemical analysis of eight sweet orange varieties (mean of two years)

<table>
<thead>
<tr>
<th>Varieties</th>
<th>Fruit weight (g)</th>
<th>Fruit size (cm²)</th>
<th>Peel thickness (mm)</th>
<th>Peel percentage (%)</th>
<th>Juice percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tarocco</td>
<td>180.00c</td>
<td>46.16ab</td>
<td>4.200ab</td>
<td>26.5b</td>
<td>41.72c</td>
</tr>
<tr>
<td>Sanguinello</td>
<td>160.00cd</td>
<td>46.80ab</td>
<td>4.567ab</td>
<td>24.2d</td>
<td>32.30e</td>
</tr>
<tr>
<td>Moro</td>
<td>143.33d</td>
<td>35.59c</td>
<td>3.967ab</td>
<td>22.6e</td>
<td>34.36de</td>
</tr>
<tr>
<td>Musambi</td>
<td>168.00c</td>
<td>47.11ab</td>
<td>4.100ab</td>
<td>25.3c</td>
<td>41.33c</td>
</tr>
<tr>
<td>Blood Red</td>
<td>176.00c</td>
<td>43.79b</td>
<td>4.933ab</td>
<td>21.7e</td>
<td>51.76b</td>
</tr>
<tr>
<td>Mars Early</td>
<td>224.67b</td>
<td>45.22ab</td>
<td>5.097ab</td>
<td>28.4a</td>
<td>36.44d</td>
</tr>
<tr>
<td>Salustiana</td>
<td>253.67a</td>
<td>51.25a</td>
<td>5.133ab</td>
<td>20.6f</td>
<td>41.33e</td>
</tr>
<tr>
<td>V. Late</td>
<td>205.33b</td>
<td>50.04ab</td>
<td>6.127a</td>
<td>25.2c</td>
<td>56.72a</td>
</tr>
<tr>
<td>LSD (0.05)</td>
<td>24.345</td>
<td>6.671</td>
<td>2.114</td>
<td>1.003</td>
<td>3.557</td>
</tr>
</tbody>
</table>

Maximum peel thickness (6.13 mm) was recorded in Valencia Late as compared to other varieties (Table). Salustiana, Mars Early and Blood Red.
showed peel thickness of 5.13, 5.10 and 4.93 mm, respectively. Minimum peel thickness (3.97 mm) was recorded in Moro. The data further showed that maximum peel percentage (28.4) was recorded in Mars Early against minimum (21.7) in Blood Red.

Valencia Late showed maximum juice percentage (56.72) followed by Blood Red (51.76), Tarocco (41.72) and Musambi (41.33). The results further showed that maximum TSS (11.60 %) was also recorded in Valencia Late while Mars Early, Salustiana and Blood Red showed the average TSS of 10.18, 10.07 and 9.86 percent, respectively. Minimum TSS (9.18%) was recorded in Moro (Table). These results confirm the findings of Aslam et al.(3) and Muhammad et al. (7).

Maximum acidity (0.92 %) was recorded in Valencia Late against minimum in Musambi (0.28%). These findings agreed to the findings of Anwar et al. (2) who reported maximum acidity percentage (1.95) in Olinda Valencia, followed by Valencia Late (1.5%), while minimum in Succari (0.54%).

Maximum seeds per fruit (15.67) were recorded in Valencia Late and Musambi followed by Blood Red (15.00). Minimum seeds (1.33) were recorded in Salustiana (Table). For fruit yield, Valencia Late topped (450.67 fruits/plant) followed by Blood Red (413.47), Salustiana (393.00) and Tarocco (391.63). Moro produced the lowest (213.63).

CONCLUSION

The study concludes that sweet orange varieties Salustiana, Musambi, Tarocco and Mars Early showed better fruit quality characters and can be planted in Faisalabad region. No doubt Valencia Late and Blood Red yielded more but fruits of both varieties were found bit acidic.

REFERENCES


