INDIAN JOURNAL OF ARID HORTICULTURE
2007, Vol. 2 (2) : 55-56

Short communication

Influence of position of fruit in relation to maturity in guava

Deepa.H. Dwivedi*, R.B. Ram and S.K. Chaturvedi
Department of Applied Plant Science (Hort.), Babasaheb Bhimrao Ambedkar University, Lucknow

Guava, the "apple of tropics" or "poor man's apple" is a popular and common fruit which belongs to the family Myrtaceae. It is grown practically in most of the states of India and excels in productivity, hardiness, adaptability and nutritive value. The fruit is a rich source of vitamin-C i.e. 234.3 mg/100g. Physical characters such as fruit weight, volume, specific gravity and dry matter content are influenced positively by their position on the tree in different directions i.e. east, west, north and south. These directions are mainly concerned with exposure of tree canopies to the light periods. The fruits from winter season crop develop more uniform colour with good quality and store better than rainy season crop, Tiwari *et al.* (2005). The disappearance of the green pigment is considered as a criteria in judging the harvest maturity.

There are visible physical appearance or bio-chemical indices of fruits that consistently reflect the appropriate stage of fruit maturity for harvest. Fruit harvesting should be carried out when the fruit is fully developed, mature end begin to turn light green. This communiqué deals with variation in physical and biochemical characters of the fruit vis-à-vis their position on the tree with reference to the direction.

The investigation was conducted in the orchard of Central Institute for Subtropical Horticulture, Rehmankhera, Lucknow during 2004-2005. Individual fruits in different directions of the tree i.e., east, west, north and south were tagged on 1st October, 2004. The fruits were harvested periodically at 10 days interval from 20th October to 20th January, 2005 and were divided into three lots having ten fruits per replication. The observation were recorded for physico-chemical attributes i.e., weight, volume, specific gravity, chromacity values, dry matter content, acidity and ascorbic acid.

Dry matter content, fruit colour, TSS, acidity and ascorbic acid content were determined by following standard procedures as described by Rangana (1986). The data was subjected to statistical analysis using MSTATC software.

Maximum fruit weight (162.9 g) was recorded from the fruits positioned in the east direction of the tree followed by south (160.68 g), north (158.43 g) and minimum was in fruits positioned in west 155.41g (Table 1). Conclusively it has been observed that fresh weight and volume of fruits increases at faster rate in the east followed by south, north and was least in the west directions. The findings are in line with the results obtained by Duecan *et al.* (1973) and Rajan and Lal (1999).

The data presented in Table 1 reveal that the maximum specific gravity was recorded in west position (1.028), while minimum (1.014) in the east direction at harvest maturity. Our findings are in consonance with Sites and Reitz, 1950b who reported that as the fruits approach maturity the specific gravity decreases thus indicating that the fruits obtained from east direction matured and ripened earlier than those positioned in other directions.

Table 1. Physical characteristics of guava fruits in cv. Sardar positioned in different directions at final harvesting stage.

Directions	Parameters			
	Fruit wt. (g)	Volume (ml)	Specific gravity	Dry matter (%)
East	162.861	160.617	1.014	13.403
West	155.414	151.237	1.028	14.483
North	158.425	154.970	1.023	13.883
South	160.679	158.367	1.017	13.583
Mean	159.345	156.298	1.020	13.838
C D at 5 %	0.578	1.231	0.001	0.357

It was observed that the lowest dry matter (13.40) content was noted in the fruits from east direction where as the highest (13.58) in fruits harvested from west direction (Table-1).This is because of utilization of photosynthates at a faster rate with growth and development of fruits, (Robinson and Lakso,1989). Total soluble solids and

*Corresponding author's E-mail:
deepahansraj@rediffmail.com

Table 2. Chemical characteristics of guava fruits cv. Sardar positioned in different directions at final harvest.

Directions	Parameters		
	TSS (%)	Acidity (%)	Ascorbic acid (mg/100 g)
East	10.267	0.429	202.107
West	9.93	0.436	195.203
North	10.00	0.432	198.980
South	10.13	0.430	197.417
Mean	10.08	0.432	198.427
C D at 5 %	0.088	0.002	1.289

ascorbic acid content also differed significantly due to stage of harvest and direction (Table-2). Among different directions, the maximumTSS value and ascorbic acid (10.27% and 202.11mg, respectively) was recorded in the fruits from east and minimum (9.93 and 195.20 g, respectively) from west direction (Table 2).

In general acidity in terms of citric acid also varied significantly in fruits borne in different directions (Table 2). Out of different directions, lowest (0.429 %) acidity was recorded in fruits positioned in east directions and highest acid contents (0.436 %) were observed from those in west direction. This could be explained well in the light of well established fact that the fruit which matures earlier exhibits less greeness and specific gravity with higher 'YI' values (Sites and Ritz, 1950a).

Based on 'L' 'a' and 'b' chromacity values, yellowness index (YI) differed significantly due to different directions.

Table 3. Chromacity value of guava fruits cv Sardar positioned in different directions at final harvest.

Directions	Parameters			
	'L' value	'a' value	'b' value	Yellowness Index
East	44.577	0.537	17.277	75.237
West	53.090	-2.807	19.870	63.757
North	50.178	-1.700	19.447	68.240
South	50.343	-1.633	19.467	69.317
Mean	49.549	-1.401	19.015	69.137
C D at 5 %	2.202	0.378	0.868	1.447

Chromacity value in terms of 'L' value increased gradually with advancement of fruit growth of every direction which was observed maximum (53.09) in west direction and minimum (44.58) in east direction at final harvest stage. Greenness of the fruit 'a' value was found maximum (-1.63) in west and minimum (0.54) from east direction (Table 3). Chromacity in terms of 'b' value was affected in relation to direction, which was recorded maximum (19.87) in west and minimum (17.28) in east at final harvest stage. Data revealed that out of different direction maximum YI (75.24) was from east followed by south, north and minimum from west (63.76) direction (Table 3). This is in further confirmation that fruits harvested from east direction mature earlier than those in other directions. The earliness in maturity may be due to the exposure of fruits to sun light for longer period than the fruits of other directions.

In conclusion, fruit maturity was affected by the position of the fruits in different directions. The fruits of Sardar guava positioned in east direction matured earlier followed by those in south and north directions, respectively.

Acknowledgement

The authors are grateful to Dr. R.K. Pathak, Director, CISH, Lucknow for providing necessary facilities during the investigation. Our thanks are also due to Dr. B.P. Singh, Principal Scientist, Post Harvest Management Division, for physico-chemical studies.

References

Duecon, W.G., Sttaver, D.N. and Williams,W.A. 1973. Isolation and temperature effect on maize growth and yield. *Crop Science*.13: 187-190.

Rajan, S. and Lal, B. 1999. Solar radiation play role in colour development on Dashehari fruits. In: *The sixth International mango symposium* held during 6-9 April at Pattaya, Thailand, p. 9.

Ranganna, S. 1986. Handbook of analysis and quality control for fruit and vegetables products. (2nd Edn). Tata McGraw-Hill Publishing Co.Ltd., New Delhi.

Robinson, T.L. and Lakso, A.N. 1989. Highest interception, yield and fruit quality of empire and delicious apple trees grown in four orchard systems. *Acta Horticulturae*. 243: 175-184.

Sites, J.W. and Reitz, H.J. 1950 a. The variation of individual "Valencia" oranges from different locations on tree as guide to sampling methods and spot picking for quality. III. Vitamin-C and Juice content of he fruit. In: *Proceeding of American Society for Horticultural Science*. 56:103.

Sites, J.W. and Ritez, H. J. 1950b. The variation of individual "Valencia" oranges from different locations on the tree as guide to sampling methods and spot picking for quality. II. Titrable acidity and the soluble solids, titrable acidity ratio of juice. In: *Proceeding of the American Society for Horticultural Science*.55: 73.

Tiwari, S., Esguerra, B. E., Dikshit, A. and Tandon, D.K. (2005). Pectin changes in specific gravity graded guava (*Psidium guajava* L.) fruit cv, Sardar during low temperature storage at 5°C. In: *Proceeding of the First International Guava Symposiumn*, held during 5-8 December at Central Institute for subtropical Horticulture, Lucknow, p. 569.