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Evaluation of cherry tomatoes for quality characters under shade net

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Abstract

The present study was conducted during early kharif, 2013 at College of Horticulture, Anantharajupeta for evaluating quality parameters on eleven genotypes (IIHR-2871, IIHR-2872, IIHR-2873, IIHR-2751, IIHR-2753, IIHR-2876, Laila, Roja, Ruhi, Sheeja, AFA 602). With respect to quality parameters was maximum TSS was recorded in Roja followed by Laila, titrable acidity was higher in IIHR-2873 followed by Roja, highest ascorbic acid content was recorded in IIHR-2753 followed by Ruhi, superior lycopene content was recorded with genotype Roja followed by Laila. The genotype Roja followed by IIHR-2871 recorded significantly maximum reducing sugars content. IIHR-2753 followed by Sheeja showed maximum values for non-reducing sugars. The genotypes, Roja and Laila were found to be promising as they recorded higher values of TSS and lycopene content and reducing sugars which can be better exploited in the market and processing industry.

Keywords: cherry tomato, Quality parameters, shade net

Introduction

The tomato plant (*Solanum Lycopersicum* L) presents a great variety of fruit characteristics, allowing its classification within different commercial groups. Among them, there is the cherry tomato, which has shown an increasing participation in the market. Cherry tomato (*Solanum Lycopersicum* var. *Cerasiforme*) plants are one of the cultivars of tomato species. It has become, for many small farmers, a good alternative, for being rustic, productive, and marketable, besides tasting good. The fruits are used in many ornamental dishes, fresh market and are highly appreciated for the excellent sweet taste and attractive red colour, because of high lycopene content and also its various forms. The fruits of cherry tomato plants have pleasing appearances and a delicious taste, and are well accepted by consumers. Cherry tomatoes are determinate, semi-determinate, and indeterminate growth habit with long racemes and many fruits of intense color and flavor and weighing between 10 and 30 g. Cherry tomatoes are resistant to diseases and tolerant to high relative humidity, have high nutritional value because of high vitamin C content and present a highly variable number of fruits per cluster (15-50). Lycopene content of cherry tomato exceeds fresh weight which is considered as high. Cherry tomato fruits are consumed more as a fruit rather than as a vegetable. Cherry tomatoes are resistant to diseases and tolerant to high relative humidity (>80%), have high nutritional value because of high vitamin C content (>57 mg/100 gfw) and present a highly variable number of fruits per cluster (15-50). Lycopene content of cherry tomato exceeds 10mg/100g fresh weight which is considered as high. Cherry tomato fruits are consumed more as a fruit rather than as a vegetable. Cherry tomatoes have powerful anti-cancer properties, useful against mouth cancer and sour mouth. Acidosis is quite common in our society leading to many ailments such as headache, fatigue, sleeplessness, absorption problems, arteriosclerosis, muscular aches and loss of calcium from the bones. Thus these problems can be prevented by adding tomatoes to diet as they have an alkali power.

Material and Methods

A field experiment was conducted to evaluate the performance of cherry tomatoes (*Solanum lycopersicum* Var. *Cerasiforme*) under 50% shade net at College of Horticulture, Anantharajupeta, Y.S.R District, Andhra Pradesh during the early kharif 2013. In this experiment eleven cherry tomato genotypes were used. IIHR-2871, IIHR-2872, IIHR-2873, IIHR-2751, IIHR-2753, IIHR-2876, were collected from IIHR Bangalore Laila, Roja, Ruhi, Sheeja, from Known you seed company Ltd and AFA 602 from Ashoka seed company. Nursery was raised in plastic pro-trays filled with sterilized coco peat. Raised beds of 4.5 m × 1 m width and 15 cm height with 15 cm walk space were prepared to raise the crop. The seedlings were transplanted under shade net at a spacing 60 cm × 45 cm between rows and

plants respectively. Drip system with in line lateral was provided at the centre of each raised bed having emitting points at every 30 cm interval with discharge rate of 4 L per hour. Black polythene mulch film of 100 micron thickness and 1.2 mt width used to cover the planting bed. Twenty five days old seedlings were transplanted under shade net by adopting a spacing of 60 cm × 45 cm. The experimental design was randomized block design with three replications. The plants were trained along the plastic twine. Drip irrigation was given daily to replenish 50 percent of open pan evaporation. Water soluble fertilizers were given through fertigation during entire crop period starting three weeks after transplanting with 19:19:19, 13:0:45.

Results and Discussion

The quality of cherry tomato fruit is very much influenced by light intensity duration and quality. The quality characters viz., titrable acidity, total soluble solids, ascorbic acid, lycopene content, non-reducing sugars reducing sugars total sugars are influenced by temperature.

TSS (0Brix)

The data pertaining to total soluble solids (TSS) showed highly significant differences among the cherry tomato genotypes. TSS of cherry tomatoes varied between 2.83 Brix and 8.46 brix significantly highest TSS was registered in Roja (8.46 ⁰B) followed by Laila (8.10 ⁰B). While the lowest TSS was recorded in IIHR-2876 (2.83 ⁰B). High TSS and low acidity are the major factors considered for fruit processing products. One per cent increase in TSS content of fruits results in 20 per cent increase in recovery of processed product. Higher TSS in Roja and Laila hybrids might be due to the enhanced deposition of solids and more conversion of organic acids to sugars. Similar studies conducted by the earlier workers Sumathi *et al.* (2013b) in tomato under poly house and Prema *et al.* (2011) and Islam *et al.* (2012) in cherry tomato.

Titrable acidity (%)

Highly significant differences among cherry tomato genotypes were observed with respect to titrable acidity percentage. Acidity percentage ranged from 0.13 to 0.48. The highest titrable acidity was recorded in the fruits of genotype IIHR-2873 (0.48%) followed by Roja (0.45%). Lowest acidity registered in genotype IIHR-2872 (0.13%). The lower acidity in these cultivars might be due to rapid utilization of organic acids in respiration during maturity. Similar results of significant differences among genotypes were also reported by Sumathi *et al.* (2013b) in poly house tomato and Prema *et al.* (2011) and Razzak *et al.* (2013) in cherry tomato.

Ascorbic acid (mg /100g)

Highly significant differences were observed with respect to ascorbic acid content of cherry tomatoes in the present study. Ascorbic acid content values ranged from 21.20 mg /100g to 27.55 mg 100g of fresh fruit. The genotype IIHR-2753 (27.55 mg/100g) followed by Ruhi (27.38 mg /100g) recorded

significantly highest ascorbic acid content but statistically IIHR-2753 and Ruhi are at par with each other. While AFA 602 (21.20 mg/100g) followed by Laila (21.28 mg/100g) recorded lowest ascorbic acid content. This significantly varied ascorbic acid content in the present study might be due to immense variation among different cherry tomato cultivars and their genetic makeup of the genotypes to perform better under controlled environment conditions. These results are in agreement with the findings of Sumathi *et al.* (2013b) in tomato under poly house and Prema *et al.* (2011), Aguirre and Cabrera (2012) and Razzak *et al.* (2013) in cherry tomato.

Lycopene content (mg 100g⁻¹)

Lycopene content of the cherry tomato fruit varied significantly among the eleven cherry tomato genotypes under study. Lycopene content ranged between 0.24 mg/100g and 8.57 mg/100g. Highest lycopene content was recorded with genotype Roja (8.57mg /100g) followed by Laila (6.85 mg /100g) and IIHR-2871(6.75 mg /100g). However Laila and IIHR-2871 are statistically at par with each other. Lowest lycopene content recorded in the genotype Sheeja (0.24 mg/100g) as it has yellow coloured fruit. In the present study variation in lycopene content might be attributed to genetic makeup and response of genotypes to perform better under favourable micro climate prevailing in shade net conditions. Similar results of varied lycopene content in the red coloured cherry tomatoes were also reported by John *et al.* (2005), Prema *et al.* (2011) Caliman *et al.* (2010) in tomato under shade net. The deep red-colour of tomato is associated with high levels of lycopene, while high β-carotene content accounts for the orange colour.

Reducing sugars

The data pertaining to reducing sugars among the genotypes is highly significant. The mean reducing sugars content ranged from 2.18 to 4.81 percent. The genotype Roja (4.81%) followed by IIHR-2871 (3.42%) recorded significantly maximum reducing sugars content. Lowest reducing sugars (2.18% are obtained with IIHR-2751.

Non-reducing sugars (%)

The data pertaining to non-reducing sugars among the genotypes is highly significant. The non-reducing sugars content ranged from 0.38 to 1.68 percent. While, IIHR-2753 (1.68%) followed by Sheeja (1.54%) showed maximum values for non-reducing sugars. However, IIHR-2753 and Sheeja are statistically at par with each other. Lowest non reducing sugars (0.38%) are obtained Ruhi.

Highly significant and varied results of reducing and non-reducing sugars in the present study could be attributed to the decreased acidity under lower light intensities causing degradation of acids during ripening and senescence in the protected environment and genetic makeup of the genotypes. Similar results were also reported by, Kumar *et al.* (2007), Caliman *et al.* (2010) and Razzak *et al.* (2013) in tomatoes produced under shade net.

Table 1: Quality parameters (Total Soluble Solids, Titrable acidity, ascorbic acid, lycopene content, reducing & non-reducing sugars, total sugars) of cherry tomato grown under shade net

Sl. No.	Genotype	TSS (°B)	Titriable acidity (%)	Ascorbic acid (mg 100g ⁻¹)	Lycopene (mg 100g ⁻¹)	Reducing sugars (%)	Non -Reducing sugars (%)	Total sugars (%)
1	IIHR-2871	3.23	0.26	27.13	6.75	3.42	0.50	3.92
2	IIHR-2872	3.92	0.13	21.79	4.85	2.23	0.42	2.65
3	IIHR-2873	4.50	0.48	21.79	4.52	2.23	0.54	2.77
4	IIHR-2751	4.65	0.24	22.81	4.20	2.18	0.47	2.65
5	IIHR-2753	4.00	0.26	27.55	4.51	2.69	1.68	4.37
6	IIHR-2876	2.83	0.45	25.95	2.89	2.30	0.73	3.09
7	LAILA	8.10	0.32	21.28	6.85	3.14	0.65	3.80
8	ROJA	8.46	0.45	22.95	8.57	4.81	0.81	5.62
9	RUHI	7.07	0.38	27.38	5.93	3.31	0.38	3.70
10	SHEEJA	6.86	0.26	21.88	0.24	2.94	1.54	4.48
11	AFA-602	5.96	0.32	21.20	6.02	2.33	0.45	2.79
	F-test	**	**	**	**	**	**	**
	SE(m) ±	0.06	0.00	0.83	0.13	0.06	0.06	0.047
	C.D at 0.05	0.17	0.01	2.48	0.38	0.18	0.19	0.140

** Significant at 1% level of significance

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