

Physico-chemical characteristics of some promising peach cultivars grown under humid temperate mid hills of Uttaranchal

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Abstract

Six important peach cultivars namely, Tessia Samisto, Early White Giant, Stark Early Giant, Hales Early, Crawford Early and July Elberta were evaluated for their physico-chemical traits under humid temperate mid-hill conditions of Uttaranchal. The maximum fruit size (6.72 x 6.15 cm), fruit weight (89.21 g) and fruit volume (91.51 ml) were recorded in the cv. Crawford Early followed by July Elberta (5.68 x 5.47 cm, 81.69 g and 83.14 ml, respectively). The maximum T.S.S. (12.79 °Brix) and total sugars (11.56%) were also registered in July Elberta, whereas maximum acidity (0.98%) and ascorbic acid (6.42 mg/100g) were recorded in the cultivars Hales Early and July Elberta, respectively. On the basis of these parameters, out of six cultivars studied, July Elberta and Crawford Early have been found superior under mid hill conditions of Uttaranchal.

Key words: Peach cultivars, physico-chemical traits, humid temperate

Introduction

Quite a good number of peach (*Prunus persica* (L.) Batsch) cultivars are grown in different regions of India, which vary in their performance depending upon the cultivar characteristics and the prevailing soil and climatic conditions. For the past many years, a large number of cultivars are being grown under the humid temperate mid hills, but most of them are conventional in nature with poor yield potential and quality traits. Although, a lot of work have been carried out on physico-chemical attributes of peaches in different regions of the country and abroad (Singh *et al.*, 1984; Khajuria *et al.*, 1986 and Mehrotra *et al.*, 1988), yet there is a great scope for assessment of new cultivars under humid temperate mid hill conditions of Uttaranchal, for identifying their suitability in terms of quality and yield potential.

Materials and methods

The present study was carried out at Horticultural Research Block of G.B. Pant University of Agriculture and Technology, Hill Campus, Ranichauri (Tehri Garhwal), Uttaranchal during 2000-2001 on 18 years old uniform growing six peach cultivars namely; Tessia Samisto, Early White Giant, Stark Early Giant, Hales Early, Crawford Early and July Elberta. The experiment was laid out in Randomized Block Design with four replications. For recording various physico-chemical attributes, ten mature fruits were randomly picked from the tree in each treatment. The estimations were done by adopting standard methods (A.O.A.C., 1984).

Results and discussion

A wide range of variation in fruit size was measured in the peach cultivars under study (Table 1). The largest size was observed in Crawford Early (6.72 x 6.15 cm) followed by July Elberta (5.68 x 5.47 cm) and the smallest in Tessia Samisto (5.05 x 4.87 cm). The variation in fruit size among the peach cultivars may be attributed to the inter-varietal characteristics. In agreement with these

findings, Singh *et al.* (1984) also reported the fruit size of peaches ranging from 6.46 x 6.72 cm (Shan-e-Punjab) to 4.24 x 4.16 cm (Sun Red).

It is also evident from the data presented in Table 1 that fruit weight and volume of different peach cultivars ranges from 49.35 g and 48.36 ml (Tessia Samisto) to 89.21 g and 91.51 ml (Crawford Early). These findings might again be due to genetical character of the variety, causing inter-varietal differences among the various peach cultivars. Khajuria *et al.* (1986) and Mehrotra *et al.* (1988) also observed the inter-varietal differences in fruit weight and volume in the different peach cultivars. A perusal of the observations presented in Table 1 reveals that specific gravity among peach cultivars varied from 0.97 (Hales Early and Crawford Early) to 1.02 (Tessia Samisto). The varied specific gravity governed by fruit weight and volume may also correspond to inter-varietal differences.

The study revealed that fruits of July Elberta possessed the maximum T.S.S. (12.79 °Brix) followed by Hales Early (12.54 °Brix), while it was minimum (9.10 °Brix) in Early White Giant (Table 2). Such varietal differences in T.S.S. are attributed to rapid translocation of sugars from leaves to the fruits, which is controlled genetically, governed by 'source-sink' relationship. These observations are similar to those of Chadha and Sankhyayan (1974) and Singh *et al.* (1984) in different peach cultivars.

Total acidity expressed in terms of acid content (Table 2), ranged between 0.77% (July Elberta) to 0.98% (Hales Early). Khajuria *et al.* (1986) and Mehrotra *et al.* (1988) reported almost similar results, while experimenting on different peach cultivars. These variations may be due to differences resulting from acidity in fruits, which basically depends on the extent of organic acids available in the fruit pulp.

The TSS: acid ratio in different peach cultivars (Table 2) ranged

Table 1. Fruit physical parameters of different peach cultivars

Cultivar	Fruit size (cm)		Fruit weight (g)	Fruit volume (ml)	Specific gravity	Pulp: stone ratio
	Length	Width				
Tessia Samisto	5.05	4.87	49.35	48.36	1.02	8.88
Early White Giant	5.50	5.48	70.78	69.69	1.01	11.69
Stark Early Giant	5.53	5.23	73.56	74.71	0.98	12.01
Hales Early	5.43	5.37	68.49	70.19	0.97	12.43
Crawford Early	6.72	6.15	89.21	91.51	0.97	13.60
July Elberta	5.68	5.47	81.69	83.14	0.98	12.81
CD ($p=0.05$)	0.29	0.07	5.11	5.24	0.02	0.82

Table 2. Fruit chemical parameters of different peach cultivars

Cultivars	T.S.S. (°Brix)	Total acidity	TSS: acid ratio	Reducing sugar	Total sugar (%)	Sugar :acid ratio	Ascorbic acid (mg/100g)
Tessia Samisto	11.44	0.92	12.08	2.42	9.55	10.35	6.10
Early White Giant	9.10	0.80	11.27	3.05	8.45	10.47	5.13
Stark Early Giant	11.90	0.85	13.96	2.10	9.42	11.06	4.50
Hales Early	12.54	0.98	12.86	2.59	8.63	8.86	4.86
Crawford Early	11.47	0.88	13.08	3.38	9.33	10.63	6.23
July Elberta	12.79	0.77	16.56	2.86	11.56	14.89	6.42
CD ($p=0.05$)	0.07	0.03	0.49	0.03	0.04	0.42	0.05

between 11.27 (Early White Giant) to 16.56 (July Elberta), which is in conformity with the results obtained by Gautam *et al.* (1986), who also recorded the TSS : acid ratio varying from 15.40 to 23.10 in different peach cultivars. Variation of TSS:acid ratio in peach cultivars occurs mainly due to differences in their sugar and acidity contents.

The reducing and total sugars were found to be the maximum in Crawford Early (3.38%) and July Elberta (11.56%), whereas in other cultivars their respective values ranged between 2.10% (Stark Early Giant) to 3.05% (Early White Giant), with respect to reducing sugar and 8.45% (Early White Giant) to 9.55% (Tessia Samisto), with respect to total sugars (Table 2). These findings are in conformity with the results obtained by Chadha and Sankhyayan (1974), who also reported the highest total sugars in July Elberta (13.58%). The variation in sugar content are mainly due to variable amount of starch, which is ultimately converted into sugar.

The maximum (14.89) and minimum (8.86) values of sugar : acid ratio were recorded in July Elberta and Hales Early, respectively, which is in conformity with the results obtained by Gautam *et al.* (1986) in peach cultivars. The variations in sugar:acid ratio in peach cultivars under study are mainly due to differences in their sugar and acid values (Table 2).

It is also evident from Table 2 that different peach cultivars significantly varied in their ascorbic acid content. The highest ascorbic acid content was recorded in July Elberta (6.42 mg/100 g), whereas the least in Stark Early Giant (4.5 mg/100g). In agreement to these finding, Singh *et al.* (1984) noticed a range of 2.70 to 6.89 mg/100g ascorbic acid in various peach cultivars.

Based on the results of the present investigation, July Elberta and Crawford Early are promising cultivars for mid-hill conditions of Uttaranchal.

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