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Chemical Studies of Exotic Mango Cultivars under South Gujarat Agro-Climatic Conditions

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ABSTRACT

The present investigation entitled "Performance of exotic mango cultivars under South Gujarat agro-climatic conditions" was conducted during 2018-19 at Agriculture Experimental Station, NAU, Paria and Center of Excellence on Post Harvest Technology, Department of Post Harvest Technology, ASPEE College of Horticulture and Forestry, Navsari Agricultural University, Navsari. The experiment was taken on 15 year old exotic mango cultivars planted at 8 m spacing in square system and laid out in a Completely Randomized Design (CRD) repeated thrice with nine treatments. Among these cultivar Maya was found to be superior with respect to TSS, ascorbic acid, reducing sugar, total sugar and overall acceptability.

Key words : *Cultivars, Maya, Overall acceptability, Exotic*

Introduction

Mango is one of the most important tropical fruits of the world. It belongs to the family Anacardiaceae. Due to its high nutritional value, delicacy, wide adaptability, flavor, attractive appearance and popularity it enjoys the status of "The King of fruits". Mango is a medium to large evergreen tree with an open or dense symmetrical canopy, long tap root system with open or dense fibrous roots.

A large number of mango varieties are grown in India but the detailed information regarding their morphological and physicochemical characteristics are not available. Dhillon *et al.* (2004) used the more constant and important qualitative and quantitative characters like leaf, fruit and stone characters in the characterization of different mango cultivars. Morphological characterization allows for the study of plant variation using visual attributes. By using morphological characters, it is not only easy to identify any cultivars well before the attainment of bearing stage but also reduces the time period required for improvement programmers. Fruits have been the major descriptors for identification of different varieties of fruit crops. The quality of mango for export is judged on the basis of size, weight, maturity, total soluble solids, acidity, specific gravity, firmness and attractive golden yellow colour on ripening (Badhe *et al.,* 2007). In order to select good quality fruits for export, there is a strong felt need to determine physico-chemical properties of various mango cultivars. The flowering and fruiting traits of a variety cannot be ignored because the yield is closely related to these parameters. Most of mango is consumed raw as a dessert fruit and the rest is being processed into diverse products (nectar, powder, canned

mango slices in syrup, chutneys, pickles, etc.). Thus, considerable and quantitative data are needed to appraise the natural variations to select excellent mango genotypes with improved nutritional quality and processing characteristics (Liu *et al.,* 2013).

The most important mango varieties in cultivation in India are Kesar, Alphonso, Amrapalli, Banganapalli, Bangalora, Bombay Green, Chausa, Dashehari, Fazli, Gulabkhas, Himsagar, Krishnabhog, Langra, Mallika, Mulgoa, Neelum, Pairi, Rajapuri, Ratna, and Vanraj, out of them Dashehari, Alphonso and Kesar are being exported to some extent in UK and USA. Hence, it is necessary to grab mango market of USA, we must have to understand the varietal preferences of these countries. The main varieties marketed in USA are Kent, Osteen, Keitt and Maya. Currently these are imported from Brazil, Mexico, Peru *etc.* With the view to assess the performance and fruit quality characters, present investigation is proposed to evaluate performance of different exotic mango cultivars under Indian conditions. the present investigation was conducted to assess the chemical characters of different exotic mango cultivars.

Materials and Methods

The present investigation entitled "Performance of exotic mango cultivars under South Gujarat agroclimatic conditions" was conducted during 2018-19 at Agriculture Experimental Station, NAU, Paria and Center of Excellence on Post Harvest Technology, Department of Post Harvest Technology, ASPEE College of Horticulture and Forestry, Navsari Agricultural University, Navsari. The experiment was taken on 15 year old exotic mango cultivars planted at 8 m spacing in square system and laid out in a Completely Randomized Design (CRD) repeated thrice with nine treatments, Comprising T_1- Lily, T_2- Osteen, T_3- Palmer, T_4- Maya, T_5- Kent, T_6- Keitt, T_7- Kensington, T_8-Sensation and T_9- Apple. Liu *et al.* (2013)

Results and Discussion

Chemical Parameters

Chemical quality varied with cultivar to cultivar in mango and TSS is one of them. The Maya recorded higher TSS (19.33 °Brix) which was found at par with Kent (18.33 °Brix). While; minimum TSS was found in Apple (11.33 °Brix). The gradual increase in TSS of fruits was found increasing in the subsequent weeks of harvest indicated upward trend of total soluble solids. Gangwar and Tripathi (1973) also reported similar trends in this constituent during harvesting and ripening of mango fruits. This variation in TSS may be due to genetic variation in cultivar and climatic conditions of the locality. The results are in accordance with the results of Limaye *et al.* (1984), Anila and Radha (2003) and Gowda and Huddar (2004).

There was significant difference for acidity percentage. Minimum acidity percentage was observed in Apple (0.056 %). While, maximum acidity was recorded in Sensation (0.21 %). These findings related to titrable acidity are in accordance with the result of Kumar (1997), who reported the range of

Table 1. Chemical parameters of different mango cultivars

Treatments	TSS (^{0}B)	Titrable acidity (%)	Ascorbic acid (mg/100g)	Reducing sugar (%)	Total sugar (%)
T_1: Lily	15.67	0.06	22.80	4.53	15.00
T_2: Osteen	13.67	0.06	25.30	5.00	15.80
T_3: Palmer	13.00	0.06	22.10	4.33	15.00
T_4: Maya	19.33	0.13	31.00	6.33	18.40
T_5: Kent	18.33	0.06	30.10	5.23	16.80
T_6: Keitt	15.33	0.12	26.90	5.10	15.90
T_7: Kensington	14.67	0.13	25.20	4.80	15.73
T_8: Sensation	11.67	0.21	30.70	5.40	17.20
T_9: Apple	11.33	0.056	28.00	5.13	16.20
S. Em. ±	0.50	0.002	0.72	0.12	0.24
C.D. at 5 %	1.48	0.01	2.14	0.35	0.70
C.V. %	5.82	5.15	4.65	3.96	2.53

0.17 to 0.33% in different mango cultivars. Chaudhary *et al.* (1997) also noted 0.14% to 0.59% titrable acidity in mango cultivar. The variation in the acidity in different cultivars of mango could be due to their varietal characters. Variable values of acidity due to different cultivars of mango were also reported by Singh *et al.* (1985). A study conducted by Uddin *et al*. (2006) confirm the findings with cultivar Amrapali with least titrable acidity (0.24%) and Mixed Special having maximum (0.53%) Titrable acidity. Similar findings have been reported by Bakshi *et al.* (2012), Okoth *et al.* (2013b), Shafique *et al*. (2006) in mango. Fruit acidity is respondent to the ripening stage of the variety. It is also dependent on prevailing environmental conditions.

The maximum ascorbic acid was recorded in Maya (31.00 mg/100 g) which was at par with Kent (30.10 mg/100 g) and minimum ascorbic acid observed in Palmer (22.10 mg/100 g). Variation in ascorbic acid content was reported by Gowda and Ramanjaneya (1994). Mitra *et al.* (2001) observed ascorbic acid content in the range of (21.66 mg/100 g-125.40 mg/100 g). Such variation in ascorbic acid could be attributed to the nature and 70 extent of genetic variability present in the mango cultivar under study. Similar findings have been reported by Uddin *et al.* (2006), Shafique *et al*. (2006) and Modesto *et al.* (2016). The higher level of ascorbic acid might be due to the perpetual synthesis of glucose 6-phosphate during the growth and development of fruits, which is considered to be the precursor of ascorbic acid. The increase in ascorbic acid content is probably due to the catalytic influence of growth substances on the biosynthesis of ascorbic acid from sugars in all the mango cultivars.

The maximum reducing sugar was recorded in Maya (6.33 %) and minimum reducing sugar observed in Palmer (4.33 %). This might be due to biochemical content of fruits change in sugar resulting into increase in the sugar content of the fruits. After the fruit ripening, starch content decreased up to some extent resulting into increase in the reducing sugars of fruits (Fuchs *et al.*, 1980). The wide variations in sugar content between cultivars may be due to response of particular cultivar to the climatic conditions during the fruit growth, fruit maturity and also due to variable genetic constitution of the cultivars. Such variations in reducing sugars was reported by Sarkar *et al.* (2001) in mango. The maximum total sugar was recorded in Maya (18.40 %) and minimum total sugar observed in Lily and Palmer (15.00 %). Total sugar content was increased because of accumulation of reducing sugar for respiration and other energy consuming ripening processes (Fuchs *et al.*, 1980). These results partially agreed with the findings of Sengupta *et al*. (2006). This difference might be due to varietal difference as well as growing conditions.

Conclusion

Result of present study revealed that all the nine exotic cultivars of mango performed satisfactorily; among these exotic cultivars, maximum TSS, ascorbic acid, reducing sugar and total sugar were recorded in Maya cultivar. The area can be increase under suitable exotic variety to fetch the growing demand of these varieties in USA and European market.

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