International Journal of Chemical Studies

P-ISSN: 2349–8528
E-ISSN: 2321–4902
IJCS 2019; 7(1): 2418-2420

Received: 21-11-2018
Accepted: 25-12-2018

Vijay SP
College of Horticulture, Rajendranagar, Hyderabad, Telangana, India

Suresh Kumar T
Horticultural Research Station, Konda Mallepally, Nalgonda, Telangana, India

Veena Joshi
College of Horticulture, Rajendranagar, Hyderabad, Telangana, India

Raja Goud
College of Horticulture, Rajendranagar, Hyderabad, Telangana, India

Correspondence
Suresh Kumar T
Horticultural Research Station, Konda Mallepally, Nalgonda, Telangana, India

Post-harvest studies on physical parameters and shelf life in different sapota varieties at ambient storage condition

Vijay SP, Suresh Kumar T, Veena Joshi and Raja Goud

Abstract
The study of ten varieties of sapota Kalipatti, Cricket Ball, Badami, Kirtibarathi, Guthi, Pala, Pakala, PKM-2, Gorayya and Singapore in CRD design with three replications. The physical parameters with respect to fruit weight, fruit diameter, fruit length, number of seeds/fruit, weight of seeds/fruit, weight of pulp/fruit, weight of peel/fruit, pulp: seed ratio and pulp: peel ratio were recorded initially and shelf life was also recorded. The maximum fruit weight, fruit diameter, number of seeds/fruit and weight of seeds/fruit were found in treatment T_2 (Cricket Ball). Maximum shelf life was observed in treatment T_4 (Kirtibarathi).

Keywords: Sapota varieties, physical parameters, shelf life and ambient storage

Introduction
Sapota (*Manilkara zapota* (L.) P. Royen) belongs to the family Sapotaceae. It is one of the delicious fruit of humid tropical and sub-tropical regions. It is a native of Tropical America and has now spread to almost all tropical countries of the world. It is also called by other names such as chikku, sapota plum, sapodilla or prickly pear. Fully ripe fruit is delicious and eaten as dessert fruit. The pulp is sweet and melting. The usual practice is to eat only the pulp. The fruit skin can also be eaten since it is richer in nutrients than the pulp. The pulp is also made into sherbets and halvas.

Sapota fruit is a good source of digestible sugar, which ranges from 12 to 20 per cent and minerals such as iron and calcium. The fruits have an appreciable amount of proteins, fat, fibre, phosphorus, carotene and vitamin C. It is also rich in bio-iron which is required for the formation of haemoglobin (Hiremath and Rokhade, 2012 [6]). It is also rich in phenolics *viz*., gallic acid, catechin, chlorogenic acid, leucodelphinidin, leucocyanidin and leucopelargonidin (Anand *et al*., 2007 [1]).

Material and Methods
Present investigation was carried out at Sri Konda Laxman Telangana State Horticultural University, Rajendranagar, Hyderabad. The fruit of different sapota varieties *viz*., T_1 (Kalipatti), T_2 (Cricket Ball), T_3 (Badami), T_4 (Kirtibarathi), T_5 (Guthi), T_6 (Pala), T_7 (Pakala), T_8 (PKM-2), T_9 (Gorayya) and T_{10} (Singapore) were harvested at optimum stage of maturity from Horticultural Research Station, Mallepally, Nalgonda district of Telangana. Fruits of uniform size, shape and maturity, free from any visible damage, scratch and decay were manually selected for the experiment to maintain the uniformity. Further the fruits were washed in solution containing 0.2 per cent sodium hypochlorite for five minutes to remove the dirt and micro-flora present on the surface of the fruits. The sanitized fruits were surface dried under electric fan and those fruits were used for further experimentation. The fruits were assessed for physical parameters like fruit weight, fruit diameter, fruit length, number of seeds/fruit, weight of seeds/fruit, weight of pulp/fruit, weight of peel/fruit, pulp: seed ratio and pulp: peel ratio initially and shelf life was also recorded. The experimental data was analyzed in factorial completely randomized block design with three replications.

Results and Discussion

Fruit weight (g/fruit)

Significantly maximum fruit weight was observed in Cricket Ball (123.42 g/fruit) followed by Gorayya (102.47 g/fruit) and Kirtibarathi (96.51 g/fruit) whereas, minimum fruit weight was found in Kalipatti (61.16 g/fruit).

The varietal variation in the quality parameters might be due to differences in their genotypic characteristics (Anon., 1998 [2]). Weight of given fruits is an important quality aspect that affects the farmers and traders revenue returns, where purchases are done on the fruit weight basis. It is also a quality aspect that influences the transportation costs of the traders. These results compared well with those obtained by Germain *et al.* (2008) [5]; Doreyappa and Huddar (2001) [4] in mango.

Fruit diameter (mm)

Significantly maximum fruit diameter was observed in Cricket Ball (67.01 mm) followed by Gorayya (60.60 mm) and Singapore (59.39 mm) whereas, least fruit diameter was found in Kalipatti (42.14 mm) which was on par with Guthi (50.81 mm).

These observations are in close conformity with the findings of Rhokade (1989) [9], Shirol *et al.*, (2005) [11] and Siddaramayya (2005) [12].

Fruit length (mm)

Significantly maximum fruit length was observed in Gorayya (68.37 mm) which was on par with PKM-2 (68.26 mm) and Singapore (65.81 mm) whereas, minimum fruit length was found in Pala (53.83 mm).

Dinesh (2015) [3] reported that, fruit shape is positively correlated with number of seeds and its distribution around the placenta. The round shaped fruits have well distributed seeds and number of seeds increases fruit weight in sapota.

Number of seeds/fruit

Significantly minimum number of seeds/fruit was observed in PKM-2 (3.33 seeds/fruit) and maximum number of seeds was recorded in Cricket Ball (8.33 seeds/fruit) followed by Kirtibarathi (6.33 seeds/fruit) and Singapore (5.00 seeds/fruit).

It is evident from the results that the number of seeds in a fruit determines the fruit shape. If number of seeds decreases it leads to reduced fruit weight and diameter of fruit. Dinesh (2015) [3] observed metaxenia effect in sapota (effect of pollen used on fruit development). The fruit size, weight of the fruit, number of seeds per fruit was influenced by pollinizer. These reports are in close agreement with the findings of Sulladamath (1975) [14] and Mone (1989) [7] which showed that the direct relationship exists between the number of seeds and fruit shape.

Weight of seeds per fruit (g)

Significantly minimum weight of seeds per fruit was observed in Pala (2.82 g), which was on par with Guthi (3.21 g), Pakala (3.31 g) and maximum weight was recorded in Cricket Ball (7.84 g) followed by Kirtibarathi (5.12 g) and Singapore (4.54 g).

These results are also in conformity with findings of Saraswathy *et al.* 2010 and Suhasini *et al.* 2012 [13].

Weight of pulp per fruit (g)

Significantly maximum weight of pulp per fruit was recorded in Kirtibarathi (68.52 g) followed by Gorayya (66.28 g) and Guthi (64.42 g) whereas, least pulp weight was found in Kalipatti (40.91 g).

Okoth *et al.* (2013) [8] reported that, pulp content is an important quality aspect to both fresh mango fruit consumers and processors. The higher the pulp yield, the better the value for money. Mango varieties with 70% and above pulp yield are better for processing.

Weight of peel per fruit (g)

Significantly lowest peel weight per fruit was noticed in Singapore (11.10 g) which was on par with Badami (11.60 g) whereas, highest peel weight was found in Kirtibarathi (17.81 g) followed by Gorayya (15.17 g) and Pakala (14.45 g).

Germain *et al.*, (2008) [5] found that indigenous mango varieties had the least peel 58% (w/w), compared to improved varieties grown in Nigeria, while Keitt variety had the highest peel content of 62% (w/w). Variety had a stronger influence on per cent peel yield than ecological zone of origin.

Pulp to seed ratio

Significantly highest pulp to seed ratio was observed in Germain *et al.*, (2008) [5] which was on par with Pala (18.98) whereas, lowest ratio was recorded in Cricket Ball (8.15).

Pulp to peel ratio

Maximum pulp to peel ratio was observed in Singapore (5.37) which was on par with Cricket Ball (5.24) whereas, significantly minimum ratio was recorded in Kalipatti (3.11).

Tapre *et al.* (2012) [15] reported that, as the ripening proceed, pulp to peel ratio was increased from 5 to 7 when the fruits become fully ripened. This could be due to the osmotic transfer of moisture from the peel to the pulp as sugar content of pulp increased. It has been suggested that pulp to peel ratio can be considered as a coefficient of ripeness (Loesecke, 1950).

Shelf life (days)

Among the 10 varieties, Kirtibarathi was recorded maximum shelf life of 10.00 days whereas, Pala found significantly minimum shelf life (6.00 days).

Shelf life is directly proportional to the rate of senescence (decay) and inversely proportional to the respiration rate. As the storage period advances, it leads to more biochemical changes resulting in softening of fruits. Hence, it was more prone to microbial spoilage.

Table 1: Physical parameters and shelf life of different varieties of sapota at ambient storage condition

Varieties	Fruit weight (g)	Fruit diameter (mm)	Fruit length (mm)	No. of seeds/ fruit	Weight of seeds per fruit (g)	Weight of pulp per fruit (g)	Weight of peel per fruit (g)	Pulp to seed ratio	Pulp to peel ratio	Shelf life (Days)
T_1	61.16	49.67	64.27	4.66	4.29	40.91	12.92	9.38	3.11	6.33
T_2	123.42	67.01	59.37	8.33	7.84	63.87	12.19	8.15	5.24	8.33
T_3	82.35	54.85	60.39	4.33	3.58	54.48	11.60	15.26	4.70	8.33
T_4	96.51	57.64	55.63	6.33	5.12	68.52	17.81	13.44	3.84	10.00
T_5	89.04	50.81	58.20	4.33	3.21	64.42	13.30	20.17	4.84	7.33
T_6	84.19	53.92	53.83	3.67	2.82	53.48	12.84	18.98	4.16	6.00
T_7	90.88	53.52	56.97	4.67	3.31	52.31	14.45	15.78	3.62	8.00
T_8	95.94	59.34	68.26	3.33	3.77	62.45	13.61	16.64	4.59	8.00
T_9	102.47	60.60	68.37	3.67	3.82	66.28	15.17	17.56	4.37	6.66
T10	87.27	59.39	65.81	5.00	4.54	59.73	11.10	13.17	5.37	8.33
Mean	91.32	56.67	61.11	4.83	4.23	58.64	13.50	14.85	4.38	7.69
SEm±	1.68	0.65	1.04	0.32	0.18	0.57	0.29	0.78	0.11	0.28
C.D. at 5%	5.01	1.93	3.10	0.93	0.54	1.71	0.86	2.32	0.32	0.83

T_1- Kalipatti T_2- Cricket Ball T_3- Badami T_4- Kirtibarathi T_5- Guthi T_6- Pala T_7- Pakala T_8- PKM-2 T_9- Gorayya T_{10}- Singapore

References

1. Anand PK, Policegoudra RS, Aradhya SM. Chemical composition and antioxidant activity of Sapota (*Achras Sapota* Linn.) fruit. Journal Food Biochemistry. 2007;31:399-414.
2. Anonymous. Text Book of sapota, Agrotech Publishing Academy, Udaipur, 1998.
3. Dinesh MR. Fruit breeding. New India Publishing agency, New Delhi- 110034, 2015, 289p.
4. Doreyappa GLND, Huddar AG. Studies on ripening changes in mango (*Magnifera indica* L.) fruits. Journal of Food Science & Technology, Mysore. 2001;38:135-137. Elsevier, London, 3:230-233.
5. Germain K, Benoit BK, Israel LM. Biochemical and Physicochemical properties of four mango varieties and some quality characteristics of their Jam. Journal of Food Processing and preservation. 2008;32:644-655.
6. Hiremath JB, Rokhade AK. Preparation of sapota candy. International Journal of Food, Agriculture and Veterinary Sciences. 2012;2(1):107-112.
7. Mone SV. Studies on growth and productivity of sapota (*Manilkara acharas* (Mill.) Fasberg) varieties. M. Sc. (Agri.) Thesis, University of Agriculture Sciences. Dharwad, 1989, 1-88pp.
8. Okoth EM, Sila DN, Onyango CA, Owino WO, Musembi SM, Mathooko FM. Evaluation of physical and sensory quality attributes of three mango varieties at three stages of ripeness, grown in lower eastern province of Kenya - part 1. Journal of Animal and Plant Sciences. 2013;13(3):2608-2618.
9. Rokhade AK, Nalawadi UG, Farooqui AA. Evaluation of promising hybrids in sapota (*Manilkara achras* (Mill.). Fosberg) at Dharwad-1 Fruit characters. Karnataka Journal of Agriculture Sciences. 1989;2:286-290.
10. Saraswathy S, Parameswari C, Parthiban S, Selvarajan M, Ponnuswami V. Evaluation of sapota genotypes for growth, yield and quality attributes. Electronic Journal of Plant Breeding. 2010;1(4):441-446.
11. Shirol AM, Kanamadi VC, Tammaiah N, Hanamashetti SI. Studied on pre-soaking of sapota rootstock khirni. Karnataka Journal of Agriculture Sciences. 2005;18(1):96-100.
12. Siddaramayya. Studies on evaluation of sapota germ plasm, M.Sc thesis, University of Agricultural Sciences, Dharwad, 2005.
13. Suhasini J, Kanamadi VC, Swamy GSK, Shirol AM, Chavan M. Performance of sapota (*Achras sapota* L.) varieties and hybrids under Ghataprabha command area. Karnataka Journal of Agriculture Sciences. 2012;25(4):548-551.
14. Sulladamath VV. Studies on growth and development in sapota var. Kalipatti. M. Sc. (Agri.) Thesis, University of Agricultural Sciences, Bangalore, 1975.
15. Tapre AR, Jain RK. Study of advanced maturity stages of banana. International Journal of Advanced Engineering Research and Studies. 2012;1(3):272-274.