Plant Archives Vol. 25, No. 2, 2025 pp. 2871-2876 e-ISSN:2581-6063 (online), ISSN:0972-5210

Plant Archives

Journal homepage: http://www.plantarchives.org

DOI Url : https://doi.org/10.51470/PLANTARCHIVES.2025.v25.no.2.414

EFFECT OF DIFFERENT PRUNING TIMES ON FRUIT QUALITY OF MANGO (*MANGIFERA INDICA* L.) COMMERCIAL CULTIVARS

M. Raghavendar[1]*, G. Vijaya Krishna[2], P. Prasanth[3] and Sanganamoni Mallesh[4]

[1]Department of Fruit Science, Post Graduate Institute for Horticultural Sciences, Sri Konda Laxman Telangana Horticultural University, Mulugu (V&M), Siddipet (Dist) – 502 279, Telangana, India.

[2]Horticultural Research Station, Aswaraopet, SKLTGHU, Telangana, India.

[3]College of Horticulture, Rajendranagar, SKLTGHU, Telangana, India.

[4]Post Graduate Institute for Horticultural Sciences, Mulugu. SKLTGHU, Telangana, India.

*Corresponding author E-mail : mandaliraghu9702@gmail.com

(Date of Receiving-21-07-2025; Date of Acceptance-28-09-2025)

ABSTRACT

The present investigation, entitled was conducted "Effect of Different Pruning Times on Fruit Quality of Mango (*Mangifera indica* L.) Cultivars" was conducted during 2024-25 at the College of Horticulture, Rajendranagar, SKLTGHU, Telangana. The physico-chemical analysis was carried out at fruit science laboratory, PGIHS, SKLTGHU, Mulugu, Siddipet. The experiment was laid out in a randomized block design (RBD) with factorial concept using four mango cultivars Banganpalli (C_1), Dashehari (C_2), Himayath (C_3) and Kesar (C_4)- under five pruning treatments: P_1 (October 1st fortnight), P_2 (October 2nd fortnight), P_3 (November 1st fortnight), P_4 (November 2nd fortnight) and P_5 (control, no pruning). The highest total soluble solids (TSS) were recorded in C_2P_3 (23.20°Brix), while the lowest were found in C_4P_5 (16.92°Brix). Titrable acidity ranged from a maximum of 0.42% in C_1P_5 to a minimum of 0.17% in C_4P_3. Ascorbic acid content was highest in C_3P_1 (35.68 mg/100g) and lowest in C_4P_5 (30.49 mg/100g). For reducing sugars, C_4P_3 (6.28%) recorded the maximum, while the minimum was observed in C_1P_5 (4.33%). Similarly, total sugars were highest in C_4P_3 (15.97%) and lowest in C_1P_5 (13.52%).

Key words : Time of pruning, Cultivars, Quality, Mango.

Introduction

Mango (*Mangifera indica* L.) is viewed as one of the widely cultivated fruit crops of India which belongs to the family Anacardiaceae, originated in Indo Burmaregion. Mango fruit is often referred as "King of fruits. India is one of the world's top producers of mangos. The international market has been drawn to the fruit because of its great flavor, delectable taste, attractive scent, eye-catching color and nutritional content. At present in India, mango is cultivated in an estimated area of 2.26 million hectare with 19.68 million tons of fruit production and productivity (8.7 MT/Ha) (NHB-2017). Mango production is significantly influenced by various climatic factors, including rainfall, temperature and sunshine, which affect all aspects of growth from vegetative development to fruit quality. Studies revealed that mango flowering requires specific temperature conditions, with a need for low night temperatures lasting 3-4 weeks, followed by elevated night temperatures above 15°C for proper fruit set (Davenport, 2006). Climate shifts can cause variations in flowering patterns, leading to both early and delayed flowering as characteristic features of mango trees (Rajan *et al*., 2011). Pruning significantly improves fruit quality in mango (*Mangifera indica* L.) by enhancing light penetration and air circulation within the canopy, which promotes better photosynthesis and fruit coloration. It helps balance vegetative and reproductive growth, leading to improved fruit size and uniformity. Timely pruning boosts sugar content (TSS), reduces acidity and enhances overall flavor and nutritional value (Das and Jana, 2012).

Materials and Methods

The experiment was conducted during 2024-25 at the College of Horticulture, Rajendranagar, SKLTGHU, Telangana. The physico-chemical analysis were carried out at Fruit Science Laboratory PGIHS, SKLTGHU, Mulugu, Siddipet.

Treatment details

Factor 1: Cultivars (4 levels)

C_1: Banganpalli

C_2: Dashehari

C_3: Himayath

C_4: Kesar

Factor 2: Time of pruning (5 levels)

P_1: October 1st fortnight

P_2: October 2nd fortnight

P_3: November 1st fortnight

P_4: November 2nd fortnight

P_5: Without pruning (Control)

Treatment combinations

T_1 : C_1 P_1 - Mango cv. Banganapalli pruned during October 1st fortnight.

T_2 : C_1 P_2 - Mango cv. Banganapalli pruned during October 2nd fortnight.

T_3 : C_1 P_3 - Mango cv. Banganapalli pruned during November 1st fortnight.

T_4 : C_1 P_4 - Mango cv. Banganapalli pruned during November 2nd fortnight.

T_5 : C1 P_5 - Mango cv. Banganapalli without pruning (Control).

T_6 : C_2 P_1 - Mango cv. Dashehari pruned during October 1st fortnight.

T_7 : C_2 P_2 - Mango cv. Dashehari pruned during October 2nd fortnight.

T_8 : C_2 P_3 - Mango cv. Dashehari pruned during November 1st fortnight.

T_9 : C_2 P_4 - Mango cv. Dashehari pruned during November 2nd fortnight.

T_{10} : C2 P_5 - Mango cv. Dashehari without pruning (Control).

T_{11} : C_3 P_1 - Mango cv. Himayath pruned during October 1st fortnight.

T_{12} : C_3 P_2 - Mango cv. Himayath pruned during October 2nd fortnight.

T_{13} : C_3 P_3 - Mango cv. Himayath pruned during November 1st fortnight.

T_{14} : C_3 P_4 - Mango cv. Himayath pruned during November 2nd fortnight.

T_{15} : C3 P_5 - Mango cv. Himayath without pruning (Control).

T_{16} : C_4 P_1 - Mango cv. Kesar pruned during October 1st fortnight.

T_{17} : C_4 P_2 - Mango cv. Kesar pruned during October 2nd fortnight.

T_{18} : C_4 P_3 - Mango cv. Kesar pruned during November 1st fortnight.

T_{19} : C_4 P_4 - Mango cv. Kesar pruned during November 2nd fortnight.

T_{20} : C_4 P_5 - Mango cv. Kesar without pruning (Control).

Selection of orchard

Six years old, well grown, uniform statured trees of mango (*Mangifera indica* L.) cv. Banganpalli, Dashehari, Himayath and Kesar were selected for the experiment. The trees were spaced at 4m × 3m and planted in square system. Trees were selected by random numbers and the experiment was laid out in randomized block design with factorial concept. All cultural practices like fertilizers, spraying of pesticides, fungicides and irrigation were uniformly practiced in experimental trees.

Method of Pruning

Tip pruning was done at the time of flower bud differentiation according to the treatments during 1st fortnight of October, 2nd fortnight of October, 1st fortnight of November, 2nd fortnight of November 2024. Pruning was done at 5 cm above the intercalation by using secateurs.

Results and Discussion

Total soluble solids (°Brix)

The percentage of total soluble solids (TSS) was determined by using The ATAGO digital hand-held refractometer PAL-1 and expressed as per cent TSS (°Brix). The comprehensive analysis of the recorded data presented in Table 1 and Fig. 1. Among the different cultivars, C_2- Dashehari recorded the maximum TSS of (22.35 ºBrix), Whereas, the minimum was recorded in C_4- Kesar (18.28 ºBrix). Among the various pruning timings P_3- November 1st fortnight recorded the maximum TSS (20.93 ºBrix), Whereas, the minimum was recorded P_5- Control (without any pruning) with (19.23 ºBrix). Similar results obtained by, severe pruning superior in respect to total soluble solids, which amounted to over

Table 1 : Comparative analysis of flower induction pruning on fruit TSS (°brix).

Factors	Time of Pruning (P)					
Cultivars (C)	**P_1**	**P_2**	**P_3**	**P_4**	**P_5**	**Mean (C)**
C_1	18.23^{e}	19.12^{d}	18.67^{e}	18.4^{e}	17.64^{f}	**18.41^{c}**
C_2	21.60^{c}	22.21^{b}	23.20^{a}	22.18^{b}	22.57^{a}	**22.35^{a}**
C_3	22.59^{a}	21.9^{b}	22.13^{b}	22.43^{a}	19.82^{d}	**21.77^{b}**
C_4	17.78^{f}	18.22^{e}	19.71^{d}	18.78^{e}	16.92^{f}	**18.28^{c}**
Mean P	**20.05^{b}**	**20.36^{a}**	**20.93^{a}**	**20.44^{a}**	**19.23^{c}**	
Factors	**SE m (±)**			**C.D @5%**		
Factor(C)	0.13			0.38		
Factor (P)	0.15			0.43		
Factor (C X P)	0.30			0.86		

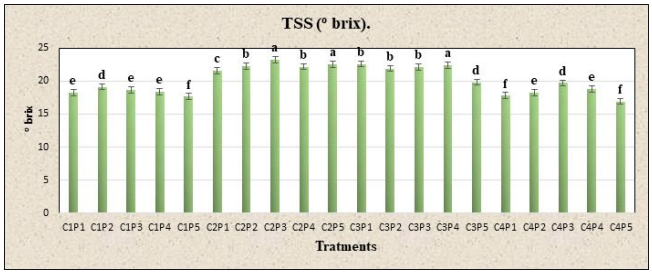

Fig. 1 : Comparative analysis of flower induction pruning on fruit TSS (°brix).

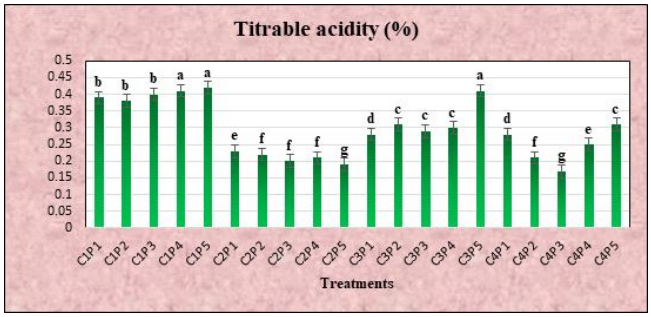

Fig. 2 : Comparative analysis of flower induction pruning on fruit ascorbic acid (mg/100g).

67% rise as compared to un-pruned (Sheikh and Rao, 2002). However, a significant difference was found in the interaction effect of different cultivars and time of pruning. C_2P_3- Dashehari + November 1st fortnight showed the maximum TSS (23.20 ºBrix).Whereas, the minimum was recorded TSS in C_4P_5- Kesar + Control (without pruning) (16.92 ºBrix). Similar results were reported by Kumar *et al*. (2018) and Singh *et al*. (2013) in Mango.

Titratable acidity (%)

Titratable acidity was estimated by the procedure elicited by Ranganna (1986). The data regarding fruit titratable acidity was significantly influenced by the different cultivars and time of pruning during the experiment was presented in Table 2 and depicted in Fig. 2. The maximum titratable acidity percentage was recorded by the cultivar C_1- Banganpalli (0.40%). Whereas, the minimum was observed by the variety C_4- Kesar (0.24%) and C_2- Dashehari (0.21%). However, a significant difference was found in different time of pruning. The maximum titratable acidity percentage was recorded with P_5- Control (without pruning). The minimum was recorded in P_3 (0.26%). The interaction effects between the cultivars and time of pruning were also found the significant differences was observed the maximum titratable acidity in C_1P_5- Banganpalli + Control (without pruning) (0.42). Whereas, the minimum titratable acidity was recorded in C_4P_3- Kesar + Nov 1st fortnight (0.17%). Similar results were reported by Singh *et al*. (2010) and Asrey *et al*. (2013).

Ascorbic acid content (mg/100g)

Ascorbic acid was estimated by the procedure elicited by Ranganna (1986). The data regarding fruit ascorbic acid was significantly influenced by the different cultivars and time of pruning during the experiment was presented in Table 3 and depicted in Fig. 3. Among the different cultivars, the maximum ascorbic acid content was recorded in C_3- Himayath (33.80 mg/100 g) and minimum in C_2- Dashehari (32.31 mg/100 g). The pruning time effect resulted in the maximum ascorbic acid content was observed in P_3- November 1st fortnight (33.83 mg/ 100 g), P_5- Control (without pruning) with minimum ascorbic acid content (31.65 mg/100 g). The interaction effect resulted in C_3P_1- Himayath + October 1st fortnight with maximum ascorbic acid (35.68 mg/100 g) and C_2P_1- Control + Banganpalli (31.41 mg/100 g) with minimum ascorbic acid content.

Reducing sugars (%)

Reducing sugars were determined by Lane and Eynon (1965). The data pertaining to reducing sugars (%) revealed significant variations among different cultivars and times of pruning, as presented in Table 4 and Fig. 4. Among the different cultivars, C_4-Kesar recorded the maximum reducing sugars (5.69%). Whereas, C_3-

Table 2 : Comparative analysis of flower induction pruning on fruit ascorbic acid (mg/100g).

Factors	Time of Pruning (P)					
Cultivars (C)	**P_1**	**P_2**	**P_3**	**P_4**	**P_5**	**Mean (C)**
C_1	0.39^{b}	0.38^{b}	0.4^{b}	0.41^{a}	0.42^{a}	**0.40^{a}**
C_2	0.23^{e}	0.22^{f}	0.20^{f}	0.21^{f}	0.19^{g}	**0.21^{d}**
C_3	0.28^{d}	0.31^{c}	0.29^{c}	0.3^{c}	0.41^{a}	**0.31^{b}**
C_4	0.28^{d}	0.21^{f}	0.17^{g}	0.25^{e}	0.31^{c}	**0.24^{c}**
Mean P	**0.29^{b}**	**0.28^{b}**	**0.26^{c}**	**0.29^{b}**	**0.33^{a}**	
Factors	**SE m (±)**			**C.D @5%**		
Factor (C)	0.002			0.006		
Factor (P)	0.002			0.007		
Factor (C X P)	0.005			0.013		

Table 3 : Comparative analysis of flower induction pruning on fruit titrable acidity (%).

Factors	Time of Pruning (P)					
Cultivars (C)	**P_1**	**P_2**	**P_3**	**P_4**	**P_5**	**Mean (C)**
C_1	32.25^{c}	33.64^{b}	32.55^{b}	32.42^{b}	31.36^{d}	**32.44^{b}**
C_2	31.41^{d}	32.43^{b}	33.23^{c}	32.04^{c}	32.43^{b}	**32.31^{b}**
C_3	35.68^{a}	32.42^{b}	34.92^{a}	33.64^{b}	32.347^{b}	**33.80^{a}**
C_4	31.65^{d}	32.16^{c}	34.65^{a}	33.16^{c}	30.49^{d}	**32.42^{b}**
Mean P	**32.75^{b}**	**32.66^{b}**	**33.83^{a}**	**32.82^{b}**	**31.657^{c}**	
Factors	**SE m (±)**			**C.D.@5%**		
Factor(C)	0.21			0.61		
Factor(P)	0.23			0.68		
Factor(C X P)	0.47			1.36		

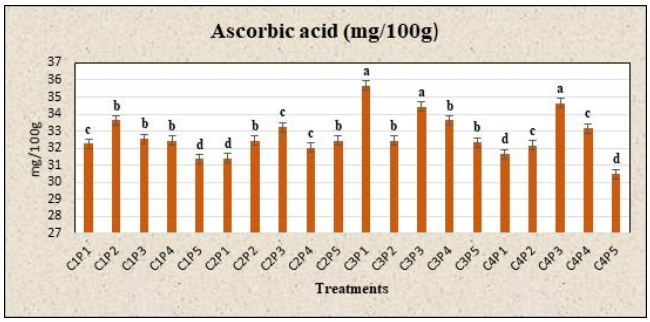

Fig. 3 : Comparative analysis of flower induction pruning on fruit titrable acidity (%).

Himayath (4.83%) was recorded minimum. Among the various times of pruning (P), P_2-Oct 2nd fortnight recorded the maximum reducing sugars (5.38%). Whereas, the minimum reducing sugars P_5- Nov 2nd fortnight (4.94%). A significant difference was observed in the interaction effect of different cultivars and time of pruning. The maximum reducing sugars was recorded in C_4P_3- Kesar + Nov 1st fortnight (6.28%). Whereas, the minimum reducing sugars was recorded in C_1P_5- Himayath + Oct 2nd fortnight (4.33%). Proper pruning reduces competition within the canopy, enhances fruit exposure to sunlight

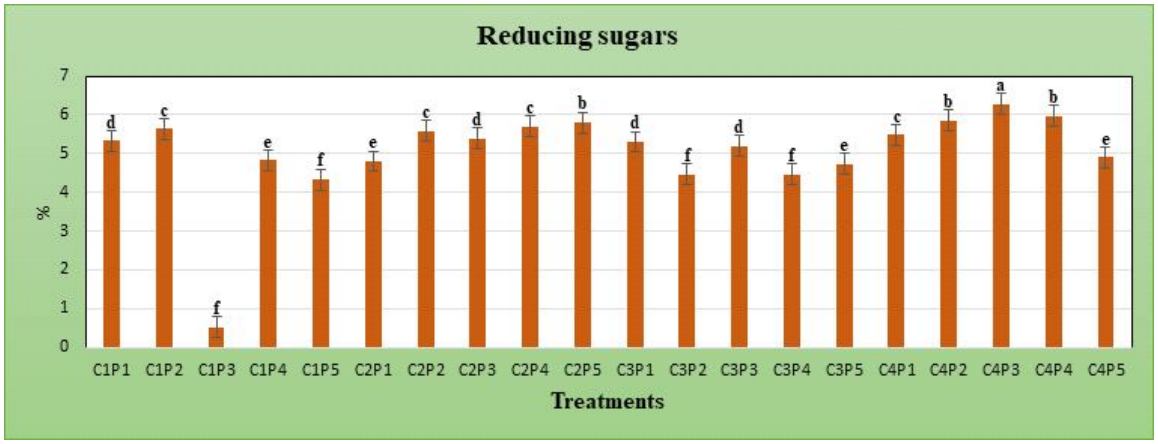

Fig. 4 : Comparative analysis of flower induction pruning on fruit reducing sugars (%).

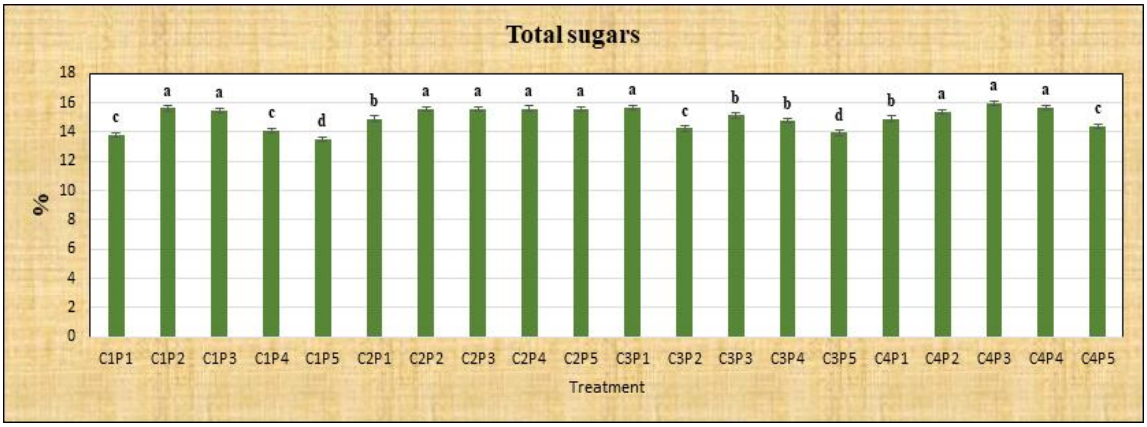

Fig. 5 : Comparative analysis of flower induction pruning on fruit total sugars (%).

Table 4 : Comparative analysis of flower induction pruning on fruit reducing sugars (%).

Factors	Time of Pruning (P)					
Cultivars (C)	**P_1**	**P_2**	**P_3**	**P_4**	**P_5**	**Mean (C)**
C_1	5.33^{d}	5.64^{c}	4.51^{f}	4.82^{e}	4.33^{f}	**4.92^{c}**
C_2	4.80^{e}	5.59^{c}	5.39^{d}	5.70^{c}	5.8^{b}	**5.46^{b}**
C_3	5.30^{d}	4.46^{f}	5.20^{d}	4.46^{f}	4.73^{e}	**4.83^{c}**
C_4	5.48^{c}	5.85^{b}	6.28^{a}	5.97^{b}	4.90^{e}	**5.69^{a}**
Mean P	**5.22^{d}**	**5.38^{a}**	**5.34^{b}**	**5.24^{c}**	**4.94^{e}**	
Factors	**SE m (±)**			**C.D @5%**		
Factor (C)	0.03			0.09		
Factor (P)	0.03			0.10		
Factor (C X P)	0.07			0.21		

Table 5 : Comparative analysis of flower induction pruning on fruit total sugars (%).

Factors	Time of Pruning (P)					
Cultivars (C)	**P_1**	**P_2**	**P_3**	**P_4**	**P_5**	**Mean (C)**
C_1	13.79^{c}	15.62^{a}	15.46^{a}	14.09^{c}	13.52^{d}	**14.49^{b}**
C_2	14.91^{b}	15.55^{a}	15.56^{a}	15.59^{a}	15.54^{a}	**15.43^{a}**
C_3	15.64^{a}	14.23^{c}	15.13^{b}	14.74^{b}	13.95^{d}	**14.74^{b}**
C_4	14.91^{b}	15.37^{a}	15.97^{a}	15.65^{a}	14.35^{c}	**15.25^{a}**
Mean P	**14.81^{c}**	**15.19^{b}**	**15.53^{a}**	**15.02^{b}**	**14.34^{d}**	
Factors	**SE m (±)**			**C.D.@ 5%**		
Factor (C)	0.09			0.28		
Factor (P)	0.10			0.31		
Factor (C X P)	0.21			0.62		

and improves carbohydrate translocation to fruits, thus increasing sugar content. Similar findings were reported by Asrey *et al*. (2013), who observed improved fruit sweetness following timely pruning.

Total sugars (%)

The comprehensive analysis of the data on total sugars, presented in Table 5 and Fig 5. Revealed significant differences across different cultivars and times of pruning. Among the different cultivars, C_4-Kesar recorded the maximum total sugars (5.69%). Whereas, C_3-Himayath (4.83%) was recorded minimum. Among the various times of pruning (P), P_2-Oct 2nd fortnight recorded the maximum total sugars (5.38%). Whereas, the minimum reducing sugars P_5- Nov 2nd fortnight (4.94%). A significant difference was observed in the interaction effect of different cultivars and time of pruning. The maximum total sugars was recorded in C_4P_3- Kesar + Nov 1st fortnight (6.28%). Whereas, the minimum reducing sugars was recorded in C_3P_2- Himayath + Oct 2nd fortnight (4.33%). Pruning collectively enhance the photosynthetic efficiency and carbohydrate translocation

to fruits, leading to higher sugar accumulation. Similar findings were reported by Singh *et al.* (2010) and Gopu *et al*. (2014) in Mango.

Conclusion

Among the cultivars Dashehari showed the highest TSS while Kesar had the lowest. Pruning in the 1st fortnight of November (P_3) improved TSS and ascorbic acid content across cultivars. P_3- Himayath had the highest reducing sugars, enhanced by pruning during the November 1st fortnight. Overall, pruning timing and cultivar selection significantly influence mango fruit quality. Mango tip pruning improves fruit quality by redirecting nutrients to fruits, enhancing sweetness and size. Timely pruning also boosts sunlight penetration and regulates fruit load, promoting better development and uniformity.

References

Asrey, R., Patel V.B., Barman K. and Pal R.M. (2013). Pruning affects fruit yield and postharvest quality in mango (*Mangifera indica* L.) Cv. Amrapali. *Fruits*, **68**, 367–380.

Davenport, T.L. (2006). Pruning strategies to maximize tropical mango production from time of planting to restoration of old orchards. *Horticult. Sci.*, **41**, 544-548.

Das, B. and Jana B.R. (2012). Effect of canopy management on growth and yield of mango cv. Amrapali planted at close spacing. *J. Food, Agricult. Environ.*, **10**, 328-331.

Gopu, B., Balamohan T.N., Soman P. and Jeyakumar P. (2014). Canopy management in mango (*Mangifera indica* L.) cv. Alphonso with reference to flowering, yield and quality characters under ultra-high density planting. *J. Appl. Horticult.*, **16(1)**, 50-53.

Lane, J.H. and Eynon L. (1965). Determination of reducing sugars by Fehling's solution with methylene blue indicator. *J. Indian Chem. Soc.*, **42(2)**, 31-39.

Rajan, S., Tiwari D., Singh V.K., Saxena P., Singh S., Reddy Y.T.N., Upreti K.K., Burondkar M.M., Bhagwan A. and Kennedy R. (2011). Application of extended BBCH scale for phenological studies in mango (*Mangifera indica* L.). *J. Appl. Horticult.*, **13(2)**, 108-114.

Ranganna, S. (1986). Carbohydrates. In : Handbook of Analysis and Quality Control for Fruit and Vegetable Products. 2nd Ed., *Tata mcgraw Hills*, New Delhi. 5 109.

Singh, S.K., Singh S.K., Sharma R.R. and Patel V.B. (2010). Influence of pruning intensity on flowering, fruit yields and floral malformation in three mango cultivars planted under high density. *Indian J. Horticult.*, **67(4)**, 84-89.