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Short communication

Quality parameters studies on *Mangifera* genus and varieties

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ABSTRACT

Quality parameters was 50 mango species/varieties showed highest weight and volume per fruit in variety Star, and the lowest in Sinchittli. Specific gravity of fruit (1.06) was found the maximum in varieties Kailwa Champa and Mohan Thakur, while was lowest in Himayuddin and Bhagalshah. The maximum acidity content was recorded in Lal Bhadyana and Sinchittli, while it was minimum in Roadwala. Total soluble solids content was found the maximum in Faizwala () and the minimum in Star () and *Mangifera odorata* (). The highest total sugars content was estimated in Faizwala and minimum in *Mangifera zeylanica* (). Non-reducing sugar content was observed maximum in Amrapali, whereas it was recorded minimum in Roshan Tawak (). The maximum reducing sugar content was found in varieties Singra and Saunfia (). *Mangifera zeylanica* and Riyat No. 1 revealed minimum content. Ascorbic acid content was found the maximum in *Mangifera zeylanica* (), and it was found the lowest in *Mangifera odorata* (). All the above results showed a great diversity for different quality characteristics, which can be taken up for making improvement.

Key words: *Mangifera* sp., mango, parameter, germplasm, varieties, quality.

Mango, the 'King of Fruits', is an evergreen fruit crop of tropical and sub-tropical regions. It has great economic potentialities as it fulfils the requirements for nutritional, medicinal, commercial, industrial, religious, needs. Its young unripe fruits earn high prices in the market for their culinary preparations, pickles, *chutney*, *amchur*, whereas ripe fruits are eaten as a fresh table fruit or are preserved in different forms like canning, juices, squash, jam, jellies, *murraba* and *am papar*. The fruit contains protein fat, carbohydrate, minerals, calcium, phosphorus, iron, vitamin A and C, riboflavin and nicotinic acid (Cheema *et al.,* 2; Singh and Singh, 11). Besides, quality traits of different *Mangifera* species is also not known.

An investigation on mango fruit was laid out in the CSA University of Agriculture and Technology, Kanpur during the year 2007-08 in randomised block design with three replications on 50 varieties/species existing in the germplasm. Five fruits of per genotype in three replication were taken for analysis at maturity. The data were recorded on weight, volume, specific gravity of fruit, acidity, total soluble solids, total sugars, non-reducing sugars, reducing sugars, ascorbic acids. AOAC methods were applied for analyzing the bio-chemical quality of pulp. The data were recorded and analysed by the method suggested by Panse and Sukhatme (6).

In the comparative results on physical characters on fruit weight; volume and specific gravity are presented in Table 1. This type of variation was also recorded in other studies (Singh and Singh, 11; Yadav *et al*., 12). Further, results revealed that the volume of fruit was found to vary from 30.00 to 680.00 cc and 32.00 to 682.00 cc in the years 2007 and 2008, respectively. It is also evident that the maximum volume of fruit was 680.00 cc and 682.00 in variety V_{35} (Star) as per weight whereas the minimum volume of fruit, 30.00 and 32.00 cc was found in variety V_{33} (Sinchittli) during 2007 and 2008, respectively. Present findings are in accordance with the results observed in mango by Popenoe *et al.* (7). Considerable variation was also observed in south Indian varieties of mango grown in north Indian conditions at Saharanpur by Prasad (8).

Specific gravity of the fruit plays an important role in assessing the maturity standard of fruit. The specific gravity 1.06 was found to be the highest in the variety V_{25} (Kailwa Champa) and V_{43} (Mohan Thakur), whereas the lowest specific gravity was recorded 0.81 and 0.89 in variety V_{16} (Himayuddin) and V_{40} (Bhagalshah) during 2007 and 2008, respectively. These results are in accordance with the findings reported by Prasad (10).

Fruits of mango species/varieties were chemically analysed, at ripe stage soon after the harvesting. The data on acidity content, total soluble solids, total sugar content, non-reducing and reducing sugar content and ascorbic acid mg/100 g of pulp were recorded and the same have been summarized in Table 2, which indicated that 2.96 and 1.91 per cent acidity was found to be the maximum in variety V_{26}

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Table 1. Physical characters of fruits of mango species/varieties.

Sl. No.	Species/ variety	Fruit wt. (g)		Fruit vol. (cc)		Sp. gr.	
		2007	2008	2007	2008	2007	2008
V_1	Riyat No. 1	225.00	220.00	230.00	230.00	0.97	0.96
V_2	Roadwala	195.00	196.00	195.00	196.00	1.00	1.00
V_3	Roshan Tawak	462.00	460.00	480.00	449.00	0.96	0.96
V_4	Saharanpur Malda	194.00	194.00	190.00	191.00	1.02	1.02
V_5	Saunfia	441.66	444.00	450.00	450.00	0.98	0.99
V_6	Veenda	105.33	104.00	110.00	111.00	0.95	0.94
V_7	Vijay Prasad	135.00	137.00	150.00	152.00	0.90	0.90
V_8	Husnara	237.00	235.00	252.00	251.00	0.93	0.94
V_9	Karela bhagalpur	295.00	298.00	180.00	281.00	1.05	1.06
V_{10}	Krishnabhog	250.00	246.00	260.00	262.00	0.96	0.94
V_{11}	Begum Pasand	140.00	141.00	150.00	151.00	0.93	0.93
V_{12}	Bharat Bhog	230.00	228.00	240.00	242.00	0.95	0.94
V_{13}	Kala Pahar	260.00	258.30	260.00	262.00	1.00	0.98
V_{14}	Laskershikan	82.00	83.00	85.00	86.00	0.96	0.97
V_{15}	Mallika	280.00	282.00	310.00	309.00	0.90	0.91
V_{16}	Himayuddin	242.00	240.00	250.00	252.00	0.81	0.95
V_{17}	Keshar	224.00	226.00	220.00	221.00	1.01	1.02
V_{18}	Asauja Deokand	170.00	170.00	170.00	172.00	1.00	0.99
V_{19}	Bombay Bhadayan	370.00	368.00	390.00	371.00	0.94	0.94
V_{20}	Baresia	197.00	200.00	200.00	202.00	0.98	0.99
V_{21}	Chawanwala	170.70	172.00	170.00	173.00	1.00	0.99
V_{22}	Chilta	108.00	110.00	115.00	116.00	0.96	0.94
V_{23}	Faizwala	230.00	230.00	236.00	235.00	0.97	0.98
V_{24}	Jalibanda	347.00	345.00	360.00	360.00	0.96	0.96
V_{25}	Kailwa Champa	102.00	100.00	96.00	98.00	1.06	1.02
V_{26}	Lal Bhadayan	90.00	92.00	90.00	92.00	1.00	1.00
V_{27}	Langra Hardoi	336.00	333.00	350.00	346.00	0.95	0.95
V_{28}	Loton	150.00	152.00	160.00	161.00	0.93	0.94
V_{29}	L.R. Special	135.00	137.00	140.00	142.00	0.96	0.96
V_{30}	Minakshi	437.00	435.00	440.00	440.00	0.99	0.99
V_{31}	Naspati	197.0	200.00	215.00	215.00	0.91	0.93
V_{32}	Samar Mahesh	250.00	251.00	265.00	266.00	0.94	0.94
V_{33}	Sinchitli	37.00	35.00	30.00	32.00	0.89	1.09
V_{34}	Singra	302.00	302.00	300.00	302.00	1.00	1.00
V_{35}	Star	655.00	657.00	680.00	682.00	0.96	0.96
V_{36}	Tipka Bhadayan	80.00	82.00	80.00	80.00	1.00	1.03
V_{37}	Kanchan	88.00	89.00	90.00	92.00	0.97	0.92
V_{38}	Pathar	255.00	254.00	260.00	261.00	0.93	0.97

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Sl. No.	Species/ variety	Fruit wt. (g)		Fruit vol. (cc)		Sp. gr.	
		2007	2008	2007	2008	2007	2008
V_{39}	Vijay	155.00	157.00	160.00	159.00	0.96	0.99
V_{40}	Bhagalshah	160.00	162.00	180.00	181.00	0.88	0.89
V_{41}	Chiratputhi	65.00	65.00	70.00	71.00	0.92	0.91
V_{42}	Indian Spring	220.00	223.00	230.00	230.00	0.95	0.97
V_{43}	Mohan Thakur	85.00	84.00	80.00	80.00	1.06	1.05
V_{44}	Amrapali	158.00	160.00	160.00	160.00	0.98	1.00
V_{45}	Jalal	405.00	400.00	430.00	431.00	0.94	0.93
V_{46}	Mess	345.00	348.00	355.00	355.00	0.97	0.98
V_{47}	Mangifera odorata Grift	168.00	166.00	150.00	181.00	0.93	0.92
V_{48}	Mangifera zeylanica Hokk. F.	85.00	83.00	90.00	92.00	0.94	0.90
V_{49}	Baramasi	280.00	278.00	250.00	251.00	1.04	1.10
V_{50}	Sadaphal	205.00	204.00	210.00	212.00	0.97	0.96
	CD at 5%	5.6228	79.7093	54.1828	1.6204	0.1281	0.0309

Table 2. Chemical analysis of fruit of mango species/varieties.

Species/ variety	Acidity (%)		TSS (%)		Total sugars (%)		Non-reducing sugar (%)		Reducing sugar (%)		Ascorbic acid (mg/100 g of pulp)	
	2007	2008	2007	2008	2007	2008	2007	2008	2007	2008	2007	2008
V_1	0.25	0.30	16.00	16.00	10.11	10.26	8.16	8.13	1.85	1.80	31.25	31.00
V_2	0.04	0.05	21.00	21.50	16.42	16.40	13.47	13.30	2.95	2.90	37.42	37.40
V_3	0.30	0.30	22.00	22.60	10.20	10.30	6.00	6.30	4.20	4.10	56.40	56.40
V_4	0.08	0.09	20.66	22.00	16.60	16.50	10.80	10.80	5.80	5.60	22.60	30.00
V_5	0.22	0.23	22.50	22.00	16.50	16.50	10.50	10.50	6.00	6.66	24.10	24.00
V_6	0.08	0.16	22.50	22.00	16.20	16.30	12.60	12.30	3.60	3.50	19.36	19.30
V_7	0.22	0.23	17.50	18.00	13.00	13.20	8.20	8.10	4.80	4.60	29.00	30.00
V_8	0.28	0.27	21.50	22.00	18.60	18.60	12.20	12.20	6.40	6.40	25.80	26.00
V_9	0.14	0.16	22.00	22.00	16.20	16.20	12.66	13.00	3.20	3.20	22.60	23.00
V_{10}	0.39	0.40	21.00	21.50	15.20	15.10	12.00	12.00	3.20	3.20	24.10	24.50
V_{11}	0.11	0.13	21.20	21.20	16.80	16.60	12.40	12.30	4.40	4.10	17.10	17.50
V_{12}	0.36	0.39	22.50	23.00	17.20	17.00	12.56	12.50	4.64	4.60	27.65	27.60
V_{13}	0.33	0.38	19.50	20.00	13.60	13.50	8.00	8.10	5.60	5.50	27.40	27.10
V_{14}	0.25	0.26	19.50	19.50	14.46	14.40	11.26	11.20	3.20	3.10	33.22	33.00
V_{15}	0.19	0.19	21.50	21.50	16.80	16.56	13.80	13.70	3.00	3.10	24.37	24.00
V_{16}	0.28	0.29	21.00	20.90	14.20	14.20	9.40	9.50	4.80	4.60	24.10	24.10
V_{17}	0.14	0.14	16.00	17.00	11.10	11.10	9.04	9.10	1.96	1.90	31.14	31.00
V_{18}	0.67	0.67	20.50	20.50	14.80	14.80	13.73	10.50	4.40	4.10	22.60	22.50
V_{19}	0.14	0.14	20.66	19.50	16.56	16.50	13.36	13.30	3.20	3.20	29.60	29.10
V_{20}	0.05	0.06	20.50	20.50	15.20	15.20	9.36	9.50	5.80	5.60	29.00	29.30

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Species/ variety	Acidity (%)		TSS (%)		Total sugars (%)		Non-reducing sugar (%)		Reducing sugar (%)		Ascorbic acid (mg/100 g of pulp)	
	2007	2008	2007	2008	2007	2008	2007	2008	2007	2008	2007	2008
V_{21}	0.06	0.06	21.00	22.00	16.10	16.30	12.64	12.60	3.46	3.50	27.00	27.00
V_{22}	0.43	0.45	16.00	16.50	10.16	10.10	7.02	7.00	3.14	3.13	49.00	49.50
V_{23}	0.25	0.25	24.00	24.00	19.17	19.10	13.27	13.25	6.43	6.40	46.00	46.50
V_{24}	0.22	0.23	21.50	22.00	16.50	16.60	12.30	12.30	4.13	4.20	25.80	25.00
V_{25}	0.58	0.59	15.00	16.00	10.00	10.30	7.05	7.00	2.95	3.00	41.35	41.50
V_{26}	2.96	1.90	15.00	15.50	11.62	11.60	9.02	9.00	2.60	2.60	48.00	49.33
V_{27}	0.16	0.19	22.50	22.60	15.68	15.71	10.70	10.50	5.00	5.00	21.00	21.00
V_{28}	0.16	0.16	16.50	17.00	12.80	12.80	10.20	10.20	2.93	2.56	32.25	32.50
V_{29}	0.19	0.20	21.50	21.00	16.00	16.00	13.15	13.30	2.80	2.80	22.60	22.60
V_{30}	0.12	0.15	23.00	22.50	18.76	18.50	14.16	14.20	4.60	4.60	30.00	30.00
V_{31}	0.30	0.30	20.50	21.00	16.00	16.40	10.60	10.60	5.40	5.30	19.36	20.00
V_{32}	0.22	0.22	16.00	17.00	11.00	11.30	7.80	7.90	3.13	3.10	35.42	36.00
V_{33}	2.01	1.91	16.50	17.00	9.60	9.90	7.70	7.60	1.90	2.00	60.00	60.50
V_{34}	0.19	0.20	22.00	21.83	13.14	13.50	6.80	6.60	6.6	6.40	32.60	32.50
V_{35}	1.20	1.15	13.00	14.00	10.12	10.12	7.12	7.10	3.00	3.10	43.85	45.85
V_{36}	1.09	1.09	18.00	19.00	13.00	13.00	9.40	9.40	3.60	3.50	37.36	37.30
V_{37}	1.31	1.30	18.00	18.50	12.60	12.50	9.00	9.00	3.60	3.60	25.80	26.00
V_{38}	0.14	0.14	21.50	21.00	15.20	15.10	11.58	11.60	3.60	3.60	38.50	39.00
V_{39}	0.25	0.26	21.50	21.50	15.00	15.10	12.20	12.00	2.80	2.56	25.46	26.00
V_{40}	0.22	0.25	16.50	17.00	12.20	12.30	7.60	7.80	4.60	4.60	22.60	22.50
V_{41}	0.16	0.17	19.00	19.00	13.60	13.60	10.40	10.50	3.13	3.30	25.80	26.00
V_{42}	0.25	0.27	19.00	19.50	12.88	13.00	8.40	8.30	4.60	4.30	22.60	22.50
V_{43}	0.25	0.26	17.00	17.10	11.96	12.00	9.10	9.10	2.95	2.80	36.42	36.50
V_{44}	0.12	0.14	22.50	22.50	18.16	18.10	14.56	14.50	3.60	3.60	60.00	60.50
V_{45}	0.58	0.55	21.50	20.66	16.40	16.30	13.00	13.00	3.40	3.50	25.80	26.10
V_{46}	0.11	0.13	16.50	17.00	11.20	11.20	8.20	8.20	3.00	3.13	24.10	24.50
V_{47}	0.16	0.17	13.00	13.50	9.40	9.50	9.40	9.50	3.00	3.00	16.10	16.50
V_{48}	1.87	1.90	14.00	15.00	8.00	9.10	7.60	7.50	1.40	1.90	70.00	70.00
V_{49}	0.70	0.70	21.50	22.00	14.80	14.60	10.80	10.60	4.00	4.10	25.80	24.25
V_{50}	0.11	0.11	20.50	16.00	17.60	17.80	14.00	14.10	3.60	3.50	24.10	24.15
CD at 5%	0.016	0.038	1.046	1.033	0.864	0.671	0.796	0.764	0.903	0.763	4.162	0.770

(Lal-Bhadayan) and V_{33} (Sinchittli) during the year 2007 and 2008, respectively. Acidity content ranged from 0.04 to 2.96 per cent, in 2007 and from 0.05 to 1.91 per cent during 2008. The minimum acidity content 0.04 and 0.05 per cent was found in variety V_2 (Roadwala) in both the years. In quality parameters these findings are in accordance with the results reported in local mango varieties by Krishnamurthi *et al*. (4), and Prasad (9).

Total soluble solid content was found to range from 13.00 to 24.00 and 13.50 to 24.00 per cent during 2007 and 2008, respectively. The maximum total soluble solid content 24.00 per cent was recorded in variety V_{23} (Faizwala), while it was found the minimum

13.00 and 13.50 per cent in variety V_{35} (Star) and species V_{47} (*Mangifera odorata*) during 2007 and 2008, respectively. Similar findings have also been reported in mango varieties by Prasad (10), and Singh and Singh (11).

The highest total sugars content 19.70 and 19.10 per cent was found in variety V_{23} (Faizwala) and it was minimum 8.00 and 9.10 per cent in species V_{48} (*Mangifera zeylanica*) during 2007 and 2008, respectively. Present results on sugar contents in fruits are similar which have also been reported by Cheema *et al.* (2) and Popenoe *al.* (7). Non-reducing sugar content of fruit was also found variable which ranged from 6.00 to 14.56 and 6.30 to 14.50 per cent in 2007 and 2008, respectively. The highest non-reducing sugar content was recorded 14.56 and 14.50 per cent in variety V_{44} (Amrapali) and the minimum content 6.00 and 6.30 per cent was observed in variety V_3 (Roshan Tawak) during 2007 and 2008, respectively. Present findings are in accordance with the results reported by Prasad (9) and Singh and Singh (11) in mango, other than these species/varieties.

The highest reducing sugar was recorded 6.00 and 6.66 per cent in variety V_{34} (Singra) and V_5 (Saunfia), whereas the lowest reducing content was exhibited by species V_{48} (*Mangifera zeylanica*) and variety V_1 (Riyat no 1) during 2007 and 2008, respectively. These results are in accordance with the findings reported by Prasad (10) and Yadav *et al.* (12).

Quality parameter ascorbic acid content varied from 16.10 to 70.00 mg/100 g of pulp in the year 2007, in the next year in 2008, it ranged from 16.50 to 70.00 mg/100 g of pulp. Species *Mangifera zeylanica* exhibited the highest ascorbic acid content 70.00 mg/100 g of pulp during both years of investigations. The lowest ascorbic acid content was recorded in species *Mangifera odorata* in 2007 and 2008, respectively. In species *zelanica* and *odorata* species indicated considerable variation in bio-chemical qualities, which could be used by the breeders for different purposes Yadav *et al.*, (10). Similar results have also been reported by Krishnamurthi *et al.* (4), and Prasad (9) in other mango varieties.

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