EVALUATION OF PHYSICO-CHEMICAL CHARACTERISTICS OF MANGO (*MANGIFERA INDICA* L.) CULTIVARS GROWN IN D. I. KHAN

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ABSTRACT

Ten mango cultivars viz. Alphanso, Anwar Retual, Dusehri, Fajri, Gulab-e-Khas, Langra, Malda, Sanglakhi, Sindhri and Suwarnareeka were evaluated in the Department of Horticulture, Gomal University, D. I. Khan, Pakistan during 2006. Langra and Malda fruits matured earlier while fruits of Fajri and Sanglakhi matured late. Malda produced higher number of fruits per panicle (55) while Alphanso and Sanglakhi gave minimum fruits (22.67). Alphanso and Fajri produced longer fruits (15.20 and 14.43 cm) while minimum fruit length was recorded in Anwar Retual (6.30 cm). Fajri excelled in fruit weight (455.9 g), seed weight (48.67 g), peel weight (84.99 g) and pulp weight (329.63g) as compared to all other cultivars. Suwarnareeka had higher percentage of pulp (92.40) while cultivar Gulab-e-Khas showed the lowest pulp percentage (61.41). However, Gulab-e-Khas excelled in vitamin C and sugars. These chemical characteristics ranged from 131-179.7 mg/100g and 15-20 percent, respectively in the cultivars studied.

KEYWORDS: ***Mangifera indica;*** **cultivars; performance; agronomic characters; organoleptic properties; Pakistan**

INTRODUCTION

Mango (*Mangifera indica* L.) belongs to the dicotyledonous family, Anacardiaceae. This fruit is believed to be nature of tropical and sub-tropical region of South Asia probably India. Mango trees grow to an impressive size and under favourable conditions it may attain a height of 25 meter. The trees are mostly evergreen and erect. Mango is considered as king of fruits and its fruit is a large drupe. The skin is smooth, thick and commonly yellow or greenish when matured. Mango fruit develops rapidly after fruit set and is ready for harvesting within 13-20 weeks, depending upon the variety and climate. Syamal and Mishra (9) reported that the highest mean fruit weight

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was recorded for Fajri (506 g) and Langra (310 g). Langra had the highest ascorbic acid, TSS and sugar contents. Shafqat *et al.* (7) noted the heaviest fruit (465.0 g) in Fajri, smallest stone in Pohilot (7.6 g) and maximum pulp in Baganpalli (79.4%). The highest TSS (27.58 brix %) and vitamin C contents (180.2 mg/100 g) were found in cultivars Ghulab-e-Khas and Sanglakhi, respectively. Sarkar *et al.* (6) observed the longest fruit (10.70 cm) and more stone wegith (20%) and total soluble solids (28) in Amparali. Pulp (78.1%) was higher in Mahmood Bahar. Mitra and Mitra (4) reported that fruit weight (6.25 g), fruit length (15.80 cm) and peel weight (91.50 g) were more in Mocha, whereas fruit breadth was greater (10.27 cm) in Mohan Bhog, Ravi *et al.* (5) observed that Dusehri fruits excelled in pulp percentage, total soluble solids and reducing sugar contents. The fruits of Bombay Green matured in 1st week of July, whereas fruits of Chaunsa matured in 4th week of July. Hoda *et al.* (3) studied ten mango hybrids for flowering, fruiting and fruit quality. Mallika generally gave the highest fruit yield, fruit weight, pulp percentage, total soluble solids ad sugar contents. Bibi *et al.* (2) reported that trees of cultivar Malda were the tallest while Langra produced higher number of flowers per panicle and fruit yield. Alphanso produced maximum fruit length/width and seed weigth.

In view of popularity and importance of mango fruit, the present research work was undertaken to assess the different physico-chemical characteristics of ten mango cultivars grown under agro-climatic conditions of Dera Ismail Khan.

MATERIALS AND METHODS

This study was conducted in the Department of Horticulture, Faculty of Agriculture, Gomal University, D.I. Khan, Pakistan during 2006. Layout system was randomized complete block design with three replications. Ten cultivars Alphanso, Anwar Retual, Dusehri, Fajri, Gulab-e-Khas, Langra, Malda, Sanglakhi, Sindhri and Suwarnareeka were selected from mango orchard of Agri. Extension. All mango plants were about 30 years of age. Three plants in each replication were selected from each cultivar. FYM was applied @ 50 kg per plant, whereas NPK were applied @ 3-3-2 kg per plant in December. The irrigation was stopped at the time of flowering but after fruit setting, the irrigation was started.

During course of study, data were taken for days to fruit setting, days to fruit maturity, number of fruits per panicle, fruit size (length x width), fruit weight, seed weight, peel weight, pulp weight, pulp percentage, vitamin C and sugar contents. The data on each parameter were individually subjected to analysis

of variance technique (8). Subsequently, the significant means were separated by least significant difference test (LSD).

RESULTS AND DISCUSSION

Days to fruit setting

Data (Table 1) showed non-significant differences for days taken to fruit setting among different mango cultivars. Malda and Langra both took minimum number of days to fruit setting (27 and 28 days). Alphanso, Anwar Retual and Dusehri took 30 days for fruit setting, while maximum days to fruit setting were recorded in Sanglakhi (36). Non-significant difference may be due to environmental conditions prevailing at that time which caused a non-significant behaviour for days to fruit setting. Contradictory to these results, Ravi *et al.* (5) evaluated 20 mango cultivars and reported that these cultivars differed in nature of producing flowers, setting fruit and ripening period.

Days to fruit maturity

Malda and Langra matured earlier (103 and 105 days) than other cultivars. Both these cultivars were similar to each other in fruit maturing. Alphanso, Sindhri and Dusehri took 110, 115 and 116 days, respectively for maturity. However, late fruit maturity was observed in Fajri and Sanglakhi (124 days each). The maturity character of different mango fruits is considered to be a genetic factor. These results agree to those of previous workers (3) who found cultivar Fajri as last maturing cultivar.

Table 1. Days to fruit setting, days to fruit maturity, number of fruits per panicle and average fruit length and width of mango cultivars.

Cultivars	Days to fruit setting	Days to fruit maturity	No. of fruits/panicles	Fruit length (cm)	Fruit width (cm)
Alphanso	30NS	110b	22.67e	15.20a	13.13a
Anwar Retual	30	120d	45.00b	6.30h	5.23ef
Dusehri	30	116c	32.33c	9.87f	4.80f
Fajri	35	124e	29.33cd	14.43b	7.27c
Gulab-e-Khas	31	118cd	25.00de	11.10e	4.90f
Langra	28	103a	33.00c	9.97f	6.23d
Malda	27	105a	55.00a	8.37g	5.84de
Sanglakhi	36	124e	22.67e	12.77c	11.23b
Sindhri	32	115c	45.00b	12.80c	6.33d
Suwarnareeka	35	120d	33.67c	11.97d	10.70b

The means sharing common letter(s) are statistically similar at 1% level of probability.
NS = Non-significant.

Number of fruits per panicle

Significantly higher number of furits per panicle (55) was produced by Malda followed by Anwar Retual and Sindhri (45 each). However, Suwarnareeka, Langra and Dusehri set statistically similar fruits per panicle (33.67, 33.33 and 32.33). Sanglakhi and Alphanso produced minimum fruits (22.67).

Fruit size

Fruit length: Data regarding fruit length of ten mango cultivars showed significant differences. Alphanso produced maximum fruit length (15.20 cm) followed by Fajri (14.43 cm). Sindhri (12.80 cm) and Sanglakhi (12.77 cm) (Table 1). It was noted that Anwar Retual produced the smallest fruit (6.30 cm) followed by Malda (8.37 cm). Bibi *et al.* (2) also reported that Alphanso had produced the longest fruit followed by Fajri and Sindhri.

Fruit width: Differences among fruit width of ten mango cultivars were also found statistically significant (Table 1). Maximum fruit width was noted in Alphanso (13.13 cm) followed by Sanglakhi (11.23 cm) and Suwarnareeka (10.70 cm) which remained statistically alike. Minimum width of fruit was recorded in Dusehri (4.80 cm) which was similar to Gulab-e-Khas (4.90 cm). Fruit width of Malda (5.84 cm) was at par with Anwar Retual (5.23 cm). It was observed that Alphanso had maximum fruit length and width and is being considered as a desirable cultivar. Similar results have been documented by Shafqat *et al.* (7) who reported that Alphanso and Fajri had the largest fruit. Several workers have studied the fruit size of mango and reported that mango cultivars differed in fruit length and width according to their genetic makeup.

Fruit weight

Highly significant differences in fruit weight were also noted among mango cultivars (Table 2). Maximum fruit weight (455.90 g) was recorded in Fajri followed by Suwarnareeka (374.36 g), Alphanso (355.33 g), Sanglakhi (349.19 g) and Sindhri (341.83 g) against minimum (129.57 g) for Anwar Retual and Malda (154.67 g). Similar results have been reported by earlier scientists (7, 9) who noted maximum mango fruit weight in Fajri.

Seed weight

Fajri and Alphanso excelled in seed weight (48.67 and 47.07 g) with a non-significant difference. Minimum seed weight (22.99 g) was recorded in Dusehri followed by Anwar Retual (30.98 g). Bibi *et al.* (2) also recorded the heaviest fruit in Fajri and Alphanso. Sarkar *et al.* (6) reported that as the fruit

weight and size in various cultivars differed, seed weight also varied within the cultivars.

Peel weight

Maximum peel weight was exhibited by cultivar Fajri (84.99 g), followed by Alphanso (71.33 g) and Sanglakhi (65.28 g) (Table 2). Statistically, similar peel weight was recorded in Langra and Gulab-e-Khas (56.72 and 54.72 g). The lowest peel weight was noted in Anwar Retual (21.87 g). Mitra and Mitra (4) evaluated 19 cultivars and reported different peel weight in these cultivars.

Pulp weight

Cultivar Fajri ranked first in pulp weight (329.63 g) followed by Suwarnareeka (326.20 g). Both these cultivars were statistically at par with each other (Table 2). Sanglakhi, Alphanso, Langra and Sindhri, also showed good pulp weight. The cultivar Anwar Retual had the lowest pulp weight due to smaller fruit size.

Table 2. Average weight of fruit, seed, peel and pulp of ten mango cultivars.

Cultivars	Fruit weight (g)	Seed weight (g)	Peel weight (g)	Pulp weight (g)
Alphanso	355.33bc*	47.07a	71.33b	241.87c
Anwar Retual	129.57g	30.98f	21.87g	75.62l
Dusehri	175.62ef	22.99g	33.47e	115.73f
Fajri	455.90a	48.67a	84.99a	329.63a
Gulab-e-Khas	193.44e	43.22b	54.72d	87.22h
Langra	308.83d	35.86de	56.72d	219.07d
Malda	157.67f	33.57ef	29.66ef	97.23g
Sanglakhi	349.19c	38.01cd	65.28c	249.87b
Sindhri	341.83c	33.42c	61.69c	204.57e
Suwarnareeka	374.36b	35.52de	26.28f	326.20a

*The means sharing common letter(s) are statistically similar at 1% level of probability.

Pulp percentage

The data (Table 3) showed that mango cultivar Suwarnareeka had the highest pulp percentage (92.40) followed by Fajri (79.49) and Langra (79.40). Other cultivars with pulp percentage of 61.41 (Gulab-e-Khas) to 77.57 (Dusehri) were statistically at par. Ravi *et al.* (5) reported that mango cultivar Dusehri excelled in pulp percentage. Sarkar *et al.* (6) reported upto 78.1 percent pulp in mango cultivars.

Table 3. Pulp percentage, vitamin C content and sugar content of ten mango cultivars.

Cultivars	Pulp percentage	Vitamin C (mg/100 g)	Sugar content (%)

Alphanso	77.21cd	165d	15d
Anwar Retual	77.50bcd	131g	20a
Dusehri	77.57bcd	141f	19b
Fajri	79.49b	169cd	18c
Gulab-e-Khas	61.41e	179a	20a
Langra	79.40bc	176ab	20a
Malda	76.63d	152e	20a
Sanglakhi	79.29bc	178ab	15d
Sindhri	76.82d	148e	18c
Suwarnareeka	92.40a	174bc	19b

Vitamin-C content/ascorbic acid

Maximum ascorbic acid was noted in the fruit of Gulab-e-Khas (179 mg/100 g) closely followed by Sanglakhi (178 mg/100g) and Langra (176 mg/100 g) (Table 3). However, these three cultivars differed non-significantly. Minimum content of vitamin-C was found in fruit of Anwar Retual (131 mg/100 g). Similar findings have been reported by Shafqat *et al.* (7) where Gulab-e-Khas and Sanglakhi topped in this parameter.

Sugar content

Maximum sugar content was found in fruit of Langra, Malda, Gulab-e-Khas and Anwar Retual (20% each) followed by Dusehri and Suwarnareeka (19% each). Alphanso and Sanglakhi had minimum sugar content (15% each). Syamal and Mishra (9) also reported that mango cultivars had different sugar contents and Langra excelled this parameter.

CONCLUSION

The study concludes that among ten mango cultivars, fruit of Malda and Langra matured earlier, whereas Fajri and Sanglakhi proved late. Cultivar Fajri had larger fruit with maximum fruit weight, peel weight, seed weight, pulp weight and pulp percentage. However, in vitamin C and sugar content, Gulab-e-Khas topped the list.

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