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Fruit Quality of Different Mango Varieties Grown in Jharkhand

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Abstract

The experiment was conducted during 2002-03, on healthy and bearing trees of 22 years old mango plants to study on fruit quality of different mango varieties grown in Jharkhand. Eleven cultivars were selected for the experiment. These were as follow : Langra, Bombay green, Mithua, Gulabkhas, Zardalu, Dashehari, Sipia, Fazli, Ketki, Prabhashanker and Mahmood Bahar. In this study Langra was kept as check cultivar. Uniform cultural practices were given to all the plants. Maximum pulp percentage was found in check Langra (77.97). Maximum peel percentage was found in Prabhashanker (20.52) and minimum stone percentage was recorded in the cultivar Bombay green (6.47). Maximum acidity was recorded in Mithua (0.31%), acidity (0.17%) in cultivar Prabhashanker was found significantly lower with respect to all other cultivar. Highest TSS was recorded in Dashehari (19.33). Maximum reducing sugar content was found in Langra (5.56%), Fazli topped the list with 12.48% non-reducing sugar. Highest total sugar content was found in Prabhashanker (15.38%). Statistical analysis of the data showed that check variety Langra had highest vitamin C content (42.82 mg/100 g) and higher sugar/acid ratio was found in Prabhashanker (88.74) which was statistically superior to other cultivars. During year 2003 maximum cost of the produce was obtained in cultivar Langra (Rs 1,990 per tree).
Key words : Fruit quality, Physical and chemical properties, Mango varieties.

Mango (*Mangifera indica* L.), the most popular and choicest fruit is grown on large scale in Jharkhand with an area, production and productivity of 7.6 thousand hectare, 89.09 thousand tones and 11.9 t/ha respectively (1). There are hundreds of varieties in mango, out of which only a few happen to be of commercial importance. The most well known varieties throughout the country are Langra, Dashehari and Baganpalli. But none of the existing commercial varieties of mango could be called ideal types as these lacks in some desirable character or the other. In the present investigation 11 mango varieties were evaluated for their physical and chemical composition, keeping quality and economics. Most popular commercial cultivar Langra of this region was used as check.

Methods

An experiment was conducted on healthy and bearing trees on twenty two years old mango plants at Birsa Agricultural University, Kanke, Ranchi during the year 2002-03. Uniform cultural practices were given to all the plants. Eleven cultivars were selected for the study. The experiment was planned in randomized block design consisting of 11 treatments with three replications. One tree was considered as a single treatment in each replication. Physical and chemical properties were estimated as follows :

$$\text{Pulp percentage} = \frac{\text{Weight of pulp}}{\text{Weight of fruit}} \times 100$$

$$\text{Peel percentage} = \frac{\text{Weight of peel}}{\text{Weight of fruit}} \times 100$$

$$\text{Stone percentage} = \frac{\text{Weight of stone}}{\text{Weight of fruit}} \times 100$$

The TSS of the juice was estimated with the help of hand refractometer and expressed in percentage. Reducing sugar was estimated by copper titration method as suggested by AOAC (2). The non-reducing sugar was calculated by deducting the reducing sugar and subsequently multiplying with the

Table 1. Physical properties of fruit.

Cultivars	Pulp (%)	Peel (%)	Stone (%)
Bombay green	75.77	17.77	6.47
Mithua	67.47	15.05	17.48
Gulabkhas	76.30	11.64	12.06
Zardalu	64.12	16.53	12.06
Dashehari	69.03	20.05	19.35
Sipia	71.53	19.30	10.92
Fazli	58.58	15.76	9.17
Ketaki	60.80	18.74	22.33
Prabhashanker	59.10	20.52	20.35
Mahmood bahar	65.60	15.35	19.02
Langra (check)	77.97	10.50	14.63
SE ±	0.84	0.48	1.08
CD (5%)	2.49	1.41	3.18
CV (%)	2.16	5.03	11.91

necessary factor (0.95). Amount of non-reducing sugar estimated was expressed in g/100g of juice. Total sugar content, 50 ml of juice was taken in a flask, 5 ml of concentrated HCl was added to it and kept for 24 hour. It was neutralized with 40% NaOH solution. Solution was then titrated against Fehling solution A and B as in reducing sugar and the amount of total sugar in g/100 g of juice was worked out. Considering 10 ml Fehling solution A and B equal to 0.05 of glucose.

$$\text{Acidity (\%)} = \frac{\text{N of NaOH} \times \text{Vol. of NaOH solution} \times \text{Equivalent wt. of citric acid} \times 100}{\text{Volume of juice} \times 1000}$$

Sugar/Acid ratio was calculated by formula sugar divided by acidity.

Vitamin C (ascorbic acid) was determined by 2, 6-dichlorophenol indophenols method (2).

$$\text{B : C ratio} = \frac{\text{Price of the produce (benefit)}}{\text{Cost of production}}$$

Results and Discussion

Physical Properties of Fruit

The maximum pulp percentage was found in check Langra (77.97) which was at par with cultivars Gulabkhas and Bombay green (Tab 1). Minimum pulp percentage was found in cv Fazli (58.58) which was significantly at par with Prabhashanker and Ketaki arranged in ascending order. It was also observed earlier (3). Minimum peel percentage was found in check Langra (10.50) which was significantly superior to other cultivars except Gulabkhas which is at par with Langra. Maximum peel percentage was found in Prabhashanker (20.52) which is statistically at par with Dashehari and Sipia rest other cultivars showed average peel percentage. Minimum stone percentage was recorded in Bombay green (6.47) which was at par with Sipia (9.17). Maximum stone percentage was found in Fazli (22.33) which was at par with Ketaki (20.49), Prabhashanker (20.35) and Zardalu (19.35) were observed in ascending order.

Chemical Properties of Fruit

Table 2 shows that maximum acidity percen-

Table 2. Chemical properties of fruit.

Cultivars	Acidity (%)	TSS (Brix)	Sugar (%) Reducing	Non-reducing	Total	Vitamin C (mg/ 100 g)	Sugar/ acid ratio
Bombay green	0.27	15.00	4.03	9.77	13.80	37.66	51.19
Mithua	0.31	16.67	4.25	9.65	13.84	29.48	44.61
Gulabkhas	0.26	15.33	3.97	8.90	12.84	30.00	50.84
Zardalu	0.24	15.67	3.66	6.69	12.38	30.20	51.69
Dashehari	0.21	19.33	4.98	9.70	14.68	42.43	71.42
Sipia	0.28	12.00	3.02	7.15	10.17	23.33	36.33
Fazli	0.25	11.67	3.42	12.48	13.50	19.25	61.85
Ketaki	0.21	14.67	3.53	9.70	13.23	27.37	63.21
Prabhashanker	0.17	17.33	4.20	10.66	15.38	26.37	88.74
Mahmood bahar	0.21	18.33	3.69	10.24	13.93	25.51	66.33
Langra (check)	0.21	18.33	5.56	9.32	13.93	42.82	66.35
SE ±	0.01	0.80	0.21	0.63	0.54	0.89	3.40
CD (5%)	0.02	2.36	0.61	1.87	1.58	2.62	10.03
CV (%)	5.92	8.73	9.11	11.27	6.80	5.01	9.93

Table 3. Benefit / cost ratio.

Cultivars	Price of fruit/kg in Rs (whole sale price)	Cost of produce/ plant (Rs)	Cost of production/ plant (Rs)	B : C ratio
Bombay green	10.00	1680	230	7.30
Mithua	9.00	1188	230	5.17
Gulabkhas	9.00	1224	230	5.32
Zardalu	8.00	1088	230	4.73
Dashehari	10.00	1760	230	7.65
Sipia	6.00	834	230	3.63
Fazli	6.00	558	230	2.43
Ketaki	6.00	666	230	2.90
Prabhashanker	7.50	1125	230	4.89
Mahmood Bahar	7.50	1118	230	4.86
Langra (check)	10.00	1990	230	8.65

tage was recorded in Mithua (0.31). The acidity percentage in cultivar Prabhashanker was found to be significantly lower (0.17) with respect to all other cultivars followed by Langra, Dashehari. Highest total soluble solids (TSS) was recorded in cultivar Dashehari (19.33) followed by Langra (18.33), Mahmood bahar (18.33) and Prabhashanker (17.33), they were also at par to each other. Other cultivars showed average total soluble solids. Maximum reducing sugar content was found in Langra (5.56%) which was statistically at par with Dashehari (4.98%) next in order was Mithua (4.25%), Prabhashanker (4.20%), Bombay green (4.03%), Gulabkhas (3.97%) and Zardalu (3.66%) and were at par among themselves in ascending order. Similar results also recorded by Lodh et al. (4). Fazli topped the list with non-reducing sugar percentage (12.48) which was significantly superior to other cultivars. Whereas Prabhashanker (10.66), Mahmood bahar (10.24), Bombay green (9.77), Dashehari (9.70), Ketaki (9.70), Mithua (9.65), Langra (9.32) and Gulabkhas (8.90) were non-significant among themselves. Similar findings were also recorded by Sharma et al. (5).

Highest total sugar content was recorded in Prabhashanker (15.38%), which was statistically at par with Dashehari (14.68%), check Langra (13.93%), Mahmood bahar (13.93%), Mithua (13.84%) and Bombay green (13.80%) arranged in ascending order. Statistical analysis of the data showed that check variety Langra had highest vitamin C content (42.82 mg), however it was at par with Dashehari (42.43 mg). Mithua (29.48), Gulabkhas (30.00 mg) and Zardalu (30.20 mg) which ranked next to Dashehari were statistically at par among themselves. Other authors also recorded high ascorbic content in these cultivars (6). Higher sugar/acid ratio was found in Prabhashanker (88.74) which was statistically superior to other cultivars. Dashehari (71.42) ranked second which was statistically at par with cultivar Langra (66.35), Mahmood bahar (66.33), Kataki (63.21) and Fazli (61.85). Minimum sugar/acid ratio was found in the Sipia (36.33). Similar, results were recorded earlier in different mango cultivars (7).

Benefit / Cost Ratio

Table 3 shows that maximum cost of the produce was obtained in cultivar Langra (Rs 1,990 per tree) followed by Dashehari and Bombay green (Rs 1,760 and 1,680, respectively). Minimum cost of the produce was being obtained in Fazli (Rs 558). Benefit/cost ratio is highest in Langra (check) i.e. 8.65 closely followed by Dashehari and Bombay green 7.65 and 7.30 respectively.

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