

A STUDY ON BIO-CHEMICAL CHARACTERISTICS OF DIFFERENT MANGO GERMPLASMS GROWN IN THE CLIMATIC CONDITION OF MYMENSINGH

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Accepted for publication: 01 October 2006

ABSTRACT

Uddin, M. Z., Rahim, M. A., Alam, M. A., Barman, J. C. and Wadud, M. A. 2006. A Study on Bio-chemical Characteristics of Different Mango Germplasms Grown in the Climatic Condition of Mymensingh. Int. J. Sustain. Crop Prod. 1(2): 16-19.

An investigation on some bio-chemical characteristics of twenty two mango germplasms namely, Rad, Farooquebhog, Neelumbori, Neelumboti, Chausa, Mallika, Tommy Atkin, Hybrid-10, Shindhu, Mixed special, Gopalbhog, Surmai Fazli, Langra, Khirsapat, Amrapali, BARI mango-1, Kent, Keitt, Palmar, Kalibhog and Sindhu was carried out at the Germplasms Center of Fruit Tree Improvement Project, Department of Horticulture, Bangladesh Agricultural University, Mymensingh during December, 2002 to December, 2003. All the germplasms were chemically analysed and highly significant differences were recorded among the germplasms. Farooquebhog possessed maximum moisture content whereas Mixed special had the highest titratable acidity. The germplasms Pahlam was top in the list in case of TSS and pH but Rad and Amrapali was also top in respect of reducing sugar and non-reducing sugar, respectively. On the other hand, maximum total sugar and sugar/acidity ratio were noted in Rad and Amrapali, respectively. Moreover, in terms of vitamin C content Shindhu was the best one among the germplasms studied.

Key words: Bio-chemical, characters, mango, germplasms

INTRODUCTION

Mango, a highly valued crop in Bangladesh, is also called the king of fruit belongs to the family Anacardiaceae. It occupies an area of 50 thousand hectares with an annual production of 187 thousand metric tones (BBS, 2002). A large number of mango germplasms are grown in the country but the fruits of a few varieties are of superior in quality. The detailed information of bio-chemical characteristics of different mango varieties of Bangladesh is scanty. The information on the bio-chemical characteristics of some mango varieties have been reported by Samad (1975); Hossain (1989); Salunkhe and Desai (1984). But the varieties of which qualities has not yet been explored need immediate study. Therefore, this study was undertaken to assess detail information on the bio-chemical characteristics of some mango germplasms grown at Mymensingh, which were not earlier evaluated.

MATERIALS AND METHODS

The experiment was carried out at the Germplasms Center of Fruit Tree Improvement Project (FTIP), Department of Horticulture, Bangladesh Agricultural University, Mymensingh during December, 2002 to December, 2003. Twenty two germplasms of mango namely, Rad, Farooquebhog, Neelumbori, Neelumboti, Chausa, Mallika, Tommy Atkin, Hybrid-10, Shindhu, Mixed special, Gopalbhog, Surmai Fazli, Langra, Khirsapat, Amrapali, BARI mango-1, Pahlam, Kent, Keitt, Palmar, Kalibhog and Sindhi were used in the study. These 22 mango germplasms were considered as the experimental treatments and the total number of plants was 66. Both the distances between plant to plant and row to row were 6m in Randomized complete Block Design with three replications. The soil was silty-loam in texture belonging to the Old Brahmaputra Flood plain (FAO, 1971) series having pH 5.5 to 6.8. The crop was manured and fertilized as per schedule described by Hossain (1989). All other intercultural operations were done as and when necessary.

Ten well matured fruits from each variety collected randomly, brought to the Laboratory in a polyethylene bag and were analyzed for various bio-chemical characteristics such as percent moisture, percent TSS, pH, percent total sugar, percent reducing sugar, percent non-reducing sugar, percent titratable acidity and vitamin-c. The measurement in respect of percent TSS, percent total sugar, percent reducing sugar, percent titratable acidity and vitamin-c were recorded with the help of Abbe refractometer, by anthrone method (Jayaraman, 1981), by dinitrosalicylic acid method (Miller, 1972), by the method of Ranganna (1979) and according to the method of Plummer (1971), respectively. During data collection age of plants was 10-12 years. Data were analyzed and the means were separated by LSD test (Gomez and Gomez, 1984).

RESULTS AND DISCUSSION

The moisture content of the fruit pulp of different mango germplasms under the study ranged from 74.58 to 86.36% (Table 1). Farooquebhog contained the highest (86.36%) moisture while the lowest moisture content (74.58%) was found in Pahlam followed by Chausa (75.87%). The present results partially agreed with the research findings of Mollah and Siddique (1973) who recorded 78.11 to 87.12% moisture content in 12 mango varieties. Samad (1975) found 78.96 to 87.55% moisture in 10 mango varieties. Total soluble solids content of 22 mango germplasms were measured at ripe stage and presented in Table 1. It was observed that the variation

in TSS among different germplasms was highly significant. Pahlam contained the highest TSS (26.27%) followed by Langra (25.20%), Khirsapat (25.17%) and Rad (25.50%). The lowest total soluble solids (19.73) were recorded in Tommy Atkin. The present finding partially agreed with the results of Bhuyan and Guha (1995) who found 16.22 to 24.14% TSS in 14 mango germplasms under the climatic conditions of Rajshahi. The pH of the juice of different mango germplasms ranged from 4.14 to 5.42 (Table 1). It was the highest (5.42) in the fruit pulp of Pahlam. The lowest pH (4.14) was noted from the juice of Hybrid-10 followed by Tommy Atkin (4.49), Neelumboti (4.69), Shindhu (4.74), Farooquebhog (4.80) and Mixed Special (4.83). Absar *et al.* (1993) found pH 4.0 to 5.2 in 10 mango varieties.

Table 1. Chemical composition of fruits in different mango germplasms

Germplasms	Moisture (%)	TSS (%)	pH	Reducing sugar (%)	Non-reducing sugar (%)	Titratable acidity (%)	Sugar/acidity ratio
Rad	78.18	25.50	5.29	7.37	12.97	0.35	57.99
Farooquebhog	86.36	21.50	4.80	3.32	11.51	0.46	32.68
Neelumbori	82.28	21.33	4.94	6.43	10.14	0.36	46.57
Neelumboti	80.79	20.50	4.69	4.88	12.28	0.28	60.21
Chausa	75.87	22.00	5.12	5.24	13.13	0.35	52.01
Mallika	81.43	23.17	5.00	3.24	12.70	0.33	48.92
Tommy Atkin	84.64	19.73	4.49	3.39	10.38	0.51	27.23
Hybrid-10	83.58	21.67	4.14	3.21	11.48	0.32	45.96
Shindhu	81.93	21.17	4.74	2.88	10.93	0.52	26.42
Mixed Special	83.94	20.00	4.83	2.82	9.89	0.53	24.19
Gopalbhog	79.66	21.67	5.04	5.02	14.07	0.33	57.38
Surmai Fazli	81.67	22.00	4.96	3.78	11.97	0.26	60.35
Langra	80.64	25.20	5.03	4.07	12.84	0.43	39.41
Khirsapat	80.76	25.17	5.17	4.87	13.35	0.36	51.22
Amrapali	79.68	21.37	5.25	5.01	15.10	0.24	81.51
BARI mango-1	80.47	20.43	5.24	4.72	14.15	0.35	54.06
Pahlam	74.58	26.27	5.42	5.41	15.01	0.25	75.66
Kent	78.51	21.93	5.03	3.14	11.38	0.44	29.50
Keitt	79.56	21.07	5.08	3.17	10.43	0.45	27.14
Palmar	77.46	20.00	5.06	3.22	11.33	0.47	31.17
Kalibhog	79.44	22.20	4.96	4.59	12.83	0.34	51.18
Sindhi	76.87	21.17	5.16	4.42	12.16	0.40	41.83
LSD 5%	1.528	1.967	0.795	0.233	0.792	0.052	6.126
1%	2.043	2.630	1.063	0.311	1.059	0.070	8.190
Level of significance	**	**	**	**	**	**	**

** = Significant at 1% level of probability

A significant difference was found in the reducing sugar of different mango germplasms studied (Table 1). Maximum reducing sugar (7.37%) was found in Rad and the lowest content of reducing sugar (2.82%) was observed in Mixed Special followed by Shindhu (2.88%). The results are in agreement with that of Chaudhari *et al.* (1997) who reported 2.6 to 7.1% reducing sugar in 19 South Indian mango varieties.

On the other hand, the non-reducing sugar content of the fruit pulp of mangoes varied from 9.89 to 15.10%. Amrapali had the highest percentage of non-reducing sugar (15.10%) while Mixed Special had the lowest percentage of non-reducing sugar (9.89%) (Table 1). Sarker and Muhsi (1978) observed 17.35% and 15.75% non-reducing sugar in Fazli and Gopalbhog, respectively. These findings differ with that of Chaudhari *et al.* (1997) who observed 6.20 to 11.50% non-reducing sugar.

All the germplasms showed wide variation in case of total sugar (Fig. 1). Rad was the highest (20.34%) and the lower percentage of sugar was recorded from Mixed Special (12.71%). These results partially agreed with the findings of Singh (1968) who recorded 11.5 to 25% total sugar. The present results however differ much from the findings of Lodh *et al.* (1974) who obtained 7.35 to 13.20% total sugar in eight varieties of mango. This difference might be due to varietal difference as well as growing climate.

A highly significant difference among different germplasms in respect of ascorbic acid was observed. The ascorbic acid content of the fruits of different mango germplasms ranged from 5.32 to 52.14 mg/100 g (Fig. 2). Shindhu had the highest content of ascorbic acid (52.14 mg/100 g) while the lowest ascorbic acid (5.32 mg/100 g) was recorded in Rad. Palaniswamy *et al.* (1974) and Absar *et al.* (1993) also reported the variation in ascorbic acid among different mango varieties.

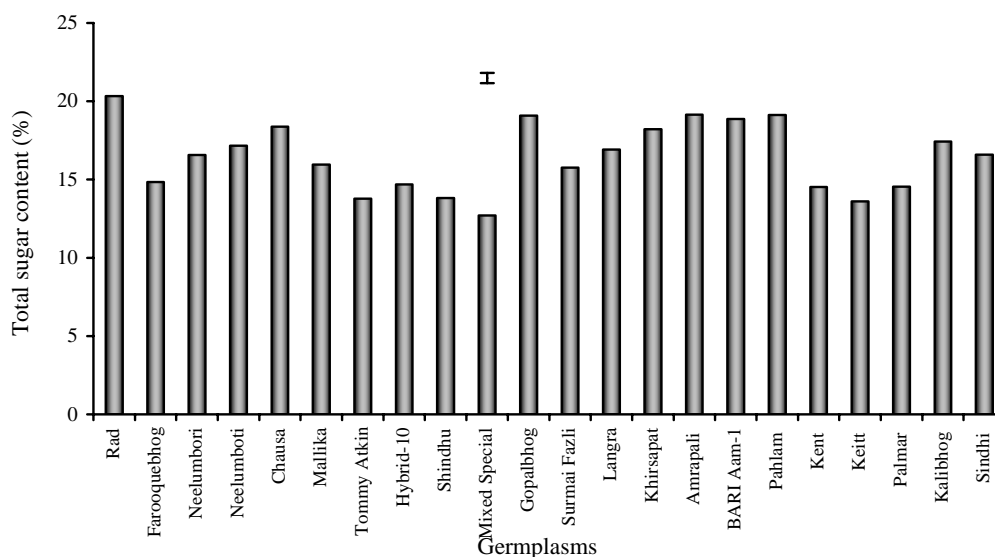


Fig. 1. Total sugar content of fruit in different mango germplasms
Vertical bar indicates LSD at 5% level of significance

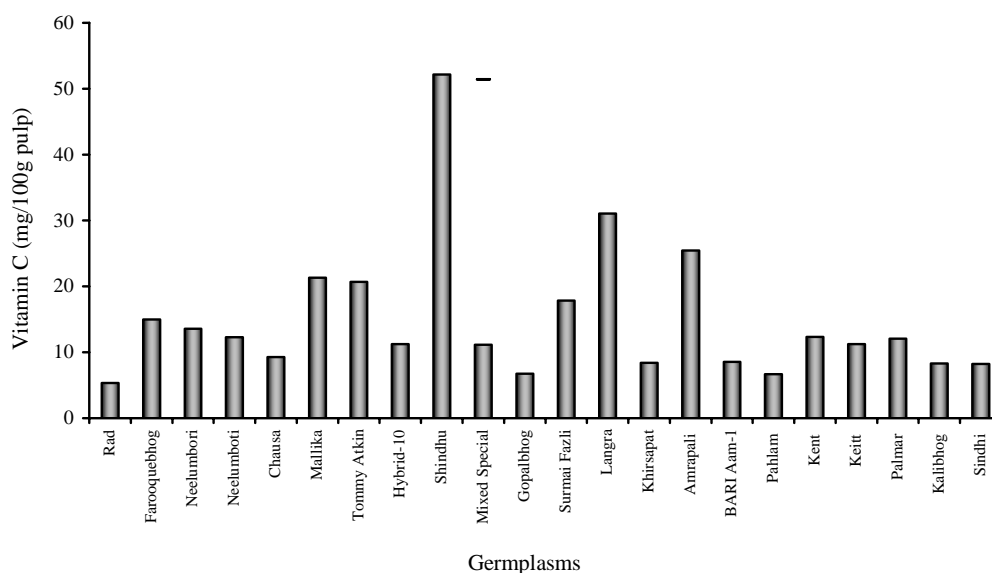


Fig. 2. Ascorbic acid (Vitamin C) content of 22 mango germplasms per 100 g pulp
Vertical bar indicates LSD at 5% level of significance

The highest titratable acidity (0.53%) was found in Mixed Special. The fruit of Amrapali had the lowest content of titratable acidity (0.24%). The present study is close agreement with the results of Prasad (1977) where titratable acidity varied from 0.312 to 0.585%. Chaudhari *et al.* (1997) also recorded 0.14 to 0.59% titratable acidity in some other mango cultivars.

All the mango germplasms showed marked variation in respect of sugar/acidity ratio. The highest sugar/acidity ratio (81.51) was recorded in Amrapali followed by Pahlam (75.66). The lowest sugar/acidity ratio (24.19) was found in Surmai Fazli followed by Shindhu (26.42) and Tommy Atkin (27.23). These results supported the findings of Lodh *et al.* (1974) where sugar/acidity ratio ranged from 5.50 to 109.20. From the present study, it

may be concluded that langra, Khirsapat, Pahlam and Rad were best in respect of highest percent of TSS and lowest percent of moisture content.

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