

Physio-Morphological and Compositional Variation in Ripe Fruit of Three Mango Varieties

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Abstract: Three varieties of mango were selected to find out the physio-morphological and chemical compositional differences in the fruits. Amrapali possessed highest pulp with skin (87.12%) and lowest stone (11.88%) but the fresh fruit weight was minimum (221.33 g). The variety of Bishawanath had the highest fresh weight (256.0 g) and stone (18.67%) and lowest in pulp with skin (81.33%), pulp stone ratio (4.4:1) and keeping quality (8.75 days). Keeping quality was maximum in Amrapali (12.5 days). Total sugar (26.85%), TSS (23.50%) and pH of pulp (6.0) were maximum in Amrapali, but Bishawanath showed maximum titratable acidity (0.87%) and Vitamin C (14.20 mg/100 g). So, Amrapali was superior in respect of all characters to other varieties.

Key words: Mango, physical and chemical compositions

Introduction

Mango (*Mangifera indica* L.) is one of the most popular fruit of Bangladesh having excellent flavour, pleasant aroma, attractive colour and taste. It is a good source of vitamin A and C, TSS (Total soluble solid) and minerals etc. It is also a medium source of carbohydrate as ripe mango pulp contain 16.9% carbohydrate (Salunkhe and Desai, 1984). There are more than hundred of mango varieties under cultivation in Bangladesh which differ in many ways from one another. Their fruits have distinct physio-morphological characteristic features and compositional variation. In recent year, some dwarf mango varieties (Amrapali and Mallika) are gaining popularity in Bangladesh. It is now cultivated in some places of Bangladesh and many farmers are interested to establish orchard of dwarf mango varieties. On the other hand, a variety named Bombai locally known as Bishawanath is popular in South-western part of Bangladesh. Several research works have been done throughout the world in this connection (Leon and Lima, 1968; Tandon and Kalra, 1983; Tripathi, 1988). In Bangladesh, sort of studies on physico-morphological and compositional variation of mango have been done by several investigator (Bhuyan and Islam, 1990; Absar *et al.*, 1993; Sarder *et al.*, 1998). But the information based on the physio-morphological and chemical composition of those varieties is still lacking. The investigation was under taken to study the physio-morphological and compositional variation of three such mango varieties.

Materials and Methods

The study was carried out in the laboratories of Horticulture and Biochemistry Department of Bangladesh Agricultural University, Mymensingh during the period from May to September 1999. Fruits of mango var. Amrapali, Mallika and Bishawanath were collected from the mango orchard of Chuadanga districts. Care was taken while selecting the fruits that all the varieties have same stages of ripeness. Observation on both physio-morphological and chemical composition was recorded. Average fruit weight was determined by taking the weight of five fruits drawn randomly. Skin along with pulp was separated from the fruits and then the weight of pulp and stone were taken. From these weight of pulp stone ratio was estimated. The keeping quality of the fruits were tested by keeping five fruits of each variety in the laboratory and skin colour, consistency and pulp colour of fruits were observed regularly.

Titratable acidity and vitamin C (Ascorbic acid) of ripe mango

pulp were estimated according to the method described by Ranganna (1979). pH of fruit pulp was determined with the help of pH meter and the total soluble solids (TSS) were estimated with Abbe's Refractometer. Reducing sugar was determined by dinitrosalicylic (DNS) acid method (Miller, 1972) and total sugar estimated colorimetrically by anthrone method (Jayaraman, 1981). All the recorded data were statistically analyzed by analysis of variance method. The mean of different parameter was compared by LSD as described by Gomez and Gomez (1984).

Results and Discussion

Physio-morphological character: The average fresh weight of fruits was found to be maximum in case of Bishawanath (256.0 g) in contrast to other varieties (Table 1). The minimum fresh weight was in Amrapali (221.33 g) and it was 236.00 g in Mallika. The difference was found to be highly significant. There was significant variation among the mango varieties in relation to pulp content. It was highest in Amrapali (87.12%) and lowest in Bishawanath (81.33%). Mallika variety had 86.03% pulp. So Amrapali possessed more pulp content than Mallika though the difference was not statistically significant. The percent weight of stone was maximum in Bishawanath (18.67) and minimum in Amrapali (11.88). The difference was highly significant. Amrapali had significantly less stone weight in comparison to other varieties. Lower stone weight is a good criterion and in this result Amrapali found to be superior, followed by Mallika (13.97%) and Bishawanath (18.67). In case of pulp stone ratio, it was maximum in the fruits of Amrapali (7.4:1) and minimum in Bishawanath (4.4:1). The difference among the mango varieties was highly significant. Though Bishawanath had also a good pulp stone ratio but it was lower than other two varieties. The pulp stone ratio was 6.2:1 in Mallika. Though the Bishawanath variety had lower pulp stone ratio but at the same time it was found that they had not better keeping quality and in their respect it was inferior to Amrapali and Mallika. The maximum keeping quality was recorded in Amrapali (12.50 days) as compared to Mallika (10.88 days) and Bishawanath (8.75 days). These results agree with the findings reported by Tyagi and Medhabati Devi (1986).

Chemical characters: There was highly significant variation among the mango varieties in relation to prescribed chemical characters of ripe fruits (Table 2). The fruits of Amrapali had the highest (10.35%) reducing sugar content as compared to

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Table 1: Variation in different physio-morphological characteristics of ripe fruits of three mango varieties

Variety	Fresh Weight/fruit (g)	Pulp with skin (%)	Stone (%)	Pulp stone ratio	Keeping quality in (days)
Amrapali	221.33	87.12	11.88	7.4:1	12.50
Mallika	236.00	86.03	13.97	6.2:1	10.88
Bishawanath	256.00	81.33	18.67	4.4:1	8.75
LSD					
0.05	2.40	2.07	1.24	0.61	1.35
0.01	3.64	3.14	1.88	0.92	2.05
Level of significant	**	**	**	**	**

Table 2: Variation in different chemical characteristics of ripe fruits of three mango varieties

Variety	Reducing sugar (%)	Non-reducing sugar (%)	Total sugar (%)	TSS (%)	Titrateable acidity (%)	Vitamin C (mg 100 ⁻¹)	pH
Amrapali	10.35	16.50	26.85	23.50	0.79	12.50	6.00
Mallika	8.00	15.13	23.13	20.70	0.60	9.60	4.90
Bishawanath	6.58	12.12	18.70	17.60	0.87	14.20	4.00
LSD							
0.05	1.67	1.56	1.44	2.02	0.03	1.98	0.99
0.01	2.66	2.37	2.18	3.06	0.05	3.03	1.50
Level of significant	**	**	**	**	**	**	**

Mallika (8.0%) and Bishawanath (6.58%). Percent non-reducing sugar content was observed maximum in Amrapali (16.50) followed by Mallika (15.13) and minimum in Bishawanath (12.12). Total sugar content of ripe mango pulp was highest in Amrapali (26.85%) and lowest in Bishawanath (18.70%). The Mallika variety contained 23.13% total sugar. The amount of total soluble solids (TSS) was maximum in Amrapali (23.50%) followed by Mallika (20.70%) and minimum in Bishawanath (17.60%). Higher TSS content is a good phenomenon of mango fruits. Highest percent of titrateable acid was found in Bishawanath variety and the lowest in Mallika, being 0.87% and 0.60%, respectively. The difference between two varieties was found to be significant in respect of titrateable acidity. Amrapali had the 0.79% titrateable acidity. Vitamin C content was found to be maximum in case of Bishawanath (14.20 mg/100 g) followed by Amrapali (12.50 mg/100 g) and minimum in case of Mallika (9.60 mg/100 g). In case of pulp pH, Amrapali had the highest and Bishawanath the lowest pH values of 6.0 and 4.0, respectively. Mallika had the 4.9 pulp pH. The above results also corroborated with the findings of Hossain *et al.* (1999).

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