



PHYSICO-CHEMICAL COMPOSITION OF FOUR PAPAYA VARIETIES GROWN AT RAJSHAHI

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Abstract

A study was carried out on four papaya varieties namely, Bombai, Deshi, Shahi (Yellow) and Shahi (Red) for their physico-chemical composition grown at Rajshahi. The results showed that maximum fruit weight was observed in Bombai and lowest in Shahi (Red). It was also found that recovery of pulp, TSS and total sugar were 80.46-87.41%, 9.0-13.0% and 6.96-10.50% respectively.

Key words: Papaya, physical composition and chemical composition.

Introduction

Bangladesh produces a huge quantity of fruits annually. Papaya (*Carica papaya*) is also an important fruit grown almost throughout Bangladesh. The production of papaya at Rajshahi is famous for its growth and fruiting. Physico-chemical characteristics are the important qualitative indexes of any fruit for fresh consumption. Total soluble solid determines the quantity of pulp and other canned products. The information regarding the physico-chemical composition of papaya is not known. Keeping this view in mind, the present investigation was undertaken.

Materials and Methods

Raw Material

Four varieties of papaya namely, Bombai, Deshi, Shahi (Yellow) and Shahi (Red) were collected from the local areas and were used in the experiments.

Methods

The mean observations of Five of each variety fruit were recorded on the fruit weight, diameter, length, pulp(edible portion) and seed and skin-weight (non-edible portion) of the fruits. The pulp percentage was also calculated on the basis of total fruit weight. pH was measured using a digital pH meter. Total soluble solids (TSS) were recorded by hand refractometer. Acidity was determined by titration method (AOAC 1975) and the results expressed as percentage of citric acid. Vitamin C was estimated by the visual titration method

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using 2,6, dichlorophenol indophenol dye (Gyorgy and Pearson 1967). Total sugars and reducing sugars were determined from the detailed procedures as described in Lane- Eynon method (Ranganna 1986).

Results and Discussion

The fruits of the four papaya varieties differed in respect to their physical and chemical characteristics. Fruit weight of the different papaya varieties varied from 645.40 to 1740.00 gm (Table 1). The highest fruit weight was recorded in Bombai and the lowest in Shahi (Red). Among the varieties, the diameter of the fruit was maximum in Bombai followed by Deshi and Shahi (Yellow). As regards to length, it was maximum in Bombai (25 cm) followed by Shahi (Red).

Pulp is the edible portion of the fruit and the variety Bombai had the highest mean pulp weight (1400.00gm) while it was lowest in Shahi (Red) variety. Highest pulp percentage (87.41%) was recorded in Shahi (Yellow) and lowest in Bombai (80.46%). The highest portion of seed was produced by Bombai (6.90%).

Skin is the non-edible waste portion of the fruit. Lower the quantities of skin better will be the quantity of fruit. Shahi (Yellow) variety contained the lowest quantity of skin (12.15%). Similar quantity of skin was recorded in Bombai and Shahi (Red).

Table 1. Analyzed physical parameters of four varieties of papaya.

Name of the variety	Fruit weight (gm)	Fruit size		Edible portion		Non-edible portion			
		Diameter (cm)	Length (cm)	Pulp wt. (gm)	pulp (%)	Seed wt. (gm)	Seed (%)	Skin wt. (gm)	Skin (%)
1	2	3	4	5	6	7	8	9	10
Bombai	1740 ± 0.415	4.4 ± 0.017	25.0± 0.24	1400.00 ± 0.537	80.46± .208	120 ± 0.1 25	6.90 ± 0.002	220.00± 0.325	12.64 ± 0.04
Deshi	709.80 ± 0.355	3.8 ± 0.002	20.0± 0.22	600.00 ± 0.380	84.53± 0.284	7.80± 0.021	1.10 ± 0.001	102.00± 0.223	14.37± 0.12
Shahi (Yellow)	686.40 ± 0.358	3.8 ± 0.003	19.0 ± 0.02	600.00 ± 0.374	87.41± 0.123	3.00± 0.015	0.44 ± .0004	83.40± 0.127	12.15± 0.15
Shahi (Red)	645.40 ± 0.046	3.7 ± 0.002	20.5± 0.025	550.00 ± 0.245	85.22± 0.240	16.20± 0.140	2.51 ± 0.0016	79.20± 0.115	12.27± 0.17

Values are mean ± standard error (S.E.).

From data presented in Table 2, it is observed that chemical composition of papaya varieties differed significantly. pH of papaya fruits varied from 4.2-4.5. TSS (Total soluble solid) judges the qualitative characters of a fruit. The total soluble solids varied from 9.0 to 13.0% in different varieties. The total soluble

solids were the highest in the fruit pulp of Bombai followed by Deshi and Shahi (Yellow). Lowest total soluble solids were recorded in the pulp of Shahi (Red). Among the variety studied, the acidity (as citric acid) ranged between 2.00 to 2.30% being highest in Bombai fruit pulp and lowest in Shahi (Red). The range of Vitamin C content was 41.0 to 42.40 mg/100gm of pulp. Vitamin C content was higher in the variety Bombai 42.40mg/100 gm followed by Shahi (Yellow) - 42.00mg/100gm, Shahi (Red) - 41.60mg/100gm and Deshi- 41.00mg/100 gm. Total sugar content varied from 6.96 to 10.50% and reducing sugar content ranged from 3.42 to 6.92%. Non-reducing sugar was higher in the variety Bombai (3.58%) and lowest in Deshi (3.17%).

Table 2. Analyzed Chemical parameters of four papaya varieties.

Name of variety	pH	TSS (%)	Acidity as citric acid (%)	Vitamin C (mg/100gm)	Total sugar (%)	Reducing sugar (%)	Non-reducing sugar (%)
Bombai	4.4 ±0.015	13.0 ± 0.045	2.30 ± 0.007	42.40 ± 0.178	10.50 ± 0.0093	6.92 ± 0.0038	3.58 ± 0.0015
Deshi	4.3 ± 0.011	12.0± 0.011	2.10 ± 0.014	41.00 ± 0.0115	8.85 ± 0.0007	5.68 ± 0.0011	3.17 ± 0.0012
Shahi (Yellow)	4.5 ± 0.008	11.0 ± 0.015	2.20 ± 0.006	42.00 ± 0.0055	7.68 ± 0.0006	4.20 ± 0.0047	3.48 ± 0.038
Shahi (Red)	4.2 ± 0.011	9.0 ± 0.047	2.00 ± 0.038	41.60 ± 0.0148	6.96 ± 0.001	3.42 ± 0.006	3.54 ± 0.011

Values are mean ± standard error (S.E.).

From the above findings, it is evident that the physico-chemical parameters of papaya varieties differed from one another which are supposed to be due to different genetic make up the variety and also because of the difference in their total fruit development and ripening period (Handbook of Agriculture 1961 and Selvaraj *et al.* 1982). The differences in physico-chemical composition of different papaya varieties are in agreement with the findings of the workers (Chan *et al.* 1971, Pal *et al.* 1980 and Selvaraj *et al.* 1982). However, the present study indicates that the fruits of Bombai, Deshi and Shahi (Yellow) may be acceptable for table purposes, canning and for various drinks and product making.

Acknowledgements

The authors are thankful to Director-in-Charge, BCSIR Laboratories, Rajshahi, Rajshahi, Bangladesh for providing facilities for the experiments.

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