

### Short Communication

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## Effect of Dehydration on Storage Stability of Two Varieties of Jamun Fruit

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Jamun fruit (*Eugenia jambolana* L.) belongs to family Myrtaceae and thrives well in Pakistan. Being a highly perishable fruit, it was, therefore, planned to preserve the available two varieties of Jamun by dehydration and to assess the changes in quality during extended period of storage.

The flesh of the fruit was separated manually from the berries after washing the fruit thoroughly and was spread on drying stainless steel trays uniformly at the rate of 1 kg/m<sup>2</sup>. The fruit was dehydrated in a cabinet type dehydrator at a starting temp. of 80° and finishing temp. of 60°. The dried product was packed (50 g/packet) in milky plastic bags (100 mm width, 125 mm length and 0.015 mm thickness), sealed, labelled and stored at ambient temp. (ranging from 18° in Dec. to 37° in July) in friction top tin container. Fresh as well as dried fruits were evaluated for composition [1]. The drying yield and rehydration ratios were calculated by using an earlier method [2]. These fruits were also evaluated for sensory quality on hedonic scale [3]. The effects of drying and storage on the quality of dehydrated Jamun fruits were compared with the student's 't' test [4].

The data regarding flesh yield, composition and sensory quality is shown in Table 1. The 'raa' variety having 68.63% flesh was found to be better than the 'desi' variety with 60.52% flesh yield. These results agreed with the earlier findings [5] in which 'raa' Jamun fruit was reported to contain more edible contents with small seeds as compared to 'desi' fruit. Desi jamun fruits had more acidity, ash, ascorbic acid and non-reducing sugar contents than 'raa' fruits. Overall sensory attributes were equally good in both the varieties of the fruits.

A substantial reduction of moisture of the fresh fruits occurred due to dehydration process thereby making the dried product a concentrated form of stable food requiring less space for stacking and transportation. The drying yields were 12.7% for 'raa' and 10.8% for 'desi' varieties when calculated on the basis of whole fresh fruits (the results are not shown). The process of dehydration caused loss ( $p < 0.01$ ) in organoleptic quality in both the varieties of fruits when compared with that of fresh fruits.

The results on the rehydration, chemical composition and sensory quality of the dehydrated fruit of two varieties are presented in Table 2. Moisture contents increased from 8.93% to 9.56% in 'raa' and from 8.52% to 9.85% in 'desi' variety of Jamun after 180 days of storage. This increase may be attributed to absorption of moisture through the permeable plastic film used as package material for dried fruits. A significant increase ( $p < 0.01$ ) in moisture of both the varieties was noticed during storage. The pH values decreased from 3.50 to 3.43 in 'raa' and from 3.60 to 3.30 in 'desi' fruits after a storage period of 180 days. This fall in pH may be due to increase in the release of H<sup>+</sup> during storage. The initial ash contents were 3.85% in 'raa' and 3.73% in 'desi' fruits with no changes during storage in both varieties. Statistical analysis showed insignificant change in ash content in dehydrated fruits. There was nearly 50% loss of ascorbic acid in these fruits at the end of storage period. This loss of ascorbic acid might be because of high storage temp. during summer. The 'raa' variety contained higher ( $p < 0.05$ ) amount of ascorbic acid than that of 'desi' fruit. In 'raa' and 'desi' fruits respectively reducing sugars decreased from 50.78 to 50% and from 50.62% to 49.69% during a storage period of 180 days. Non-reducing sugars decreased from 4.70% to 4.07% in 'raa' and from 4.90% to 4.18% in 'desi' fruits during storage. This data showed insignificant changes in reducing for both varieties and storage as well, but significant variations due to varieties ( $p < 0.01$ ) and storage ( $p < 0.05$ ) for sucrose.

TABLE 1. QUALITY CHARACTERISTICS IN TWO VARIETIES OF JAMUN FRUIT AT HARVEST.

Characteristics	Fruit varieties	
	Raa	Desi
Flesh yield (%)	68.63	60.52
Moisture (%)	90.42	89.64
Total soluble solids (%)	9.57	9.18
Acidity (%)	0.7	0.75
Ash (%)	1.01	1.08
Reducing sugars (%)	8.33	7.90
Non-reducing sugars (%)	1.18	1.43
Ascorbic acid (mg/100g)	12	15
Colour score	8.50	8.55
Flavour score	8.37	8.43
Taste score	8.50	8.17
Sweetness score	8.33	8.20
Texture score	7.50	7.30
Overall acceptability rating (out of 50)	41.20	40.65

Results are expressed as means of three observations for physico-chemical analysis and of 8 judges for sensory scores.

TABLE 2. SHOWING THE EFFECT OF STORAGE ON SOME CHEMICAL CONSTITUENTS, REHYDRATION RATIO AND SENSORY QUALITY OF DE-HYDRATED FLESH OF TWO VARIETIES OF JAMUN FRUIT.

Variety	Storage (days)	Moisture (%)	pH	Ash (%)	Reducing sugars(%)	Non-reducing sugars (%)	Ascorbic acid (mg/100 g)	Rehydration ratio	Overall sensory rating (out of 50)
Raa	0	8.93	3.50	3.85	50.78	4.70	100	5.2	36
	45	9.18	3.50	3.85	50.77	4.55	89	5.1	35
	90	9.50	3.47	3.86	50.35	4.10	78	5.0	33
	135	9.53	3.43	3.86	50.30	4.09	62	4.8	31
	180	9.56	3.43	3.85	50.00	4.07	50	4.7	29
	Means:	9.34	3.47	3.85	50.44	4.30	75.8	4.96	32.8
Desi	0	8.52	3.60	3.73	50.62	4.90	117	4.1	35
	45	9.02	3.43	3.73	50.00	4.87	105	4.0	34
	90	9.06	3.40	3.74	50.00	4.79	90	3.9	33
	135	9.15	3.30	3.74	49.74	4.73	75	3.7	32
	180	9.85	3.30	3.74	49.69	4.18	60	3.6	30
	Means:	9.12	3.41	3.73	50.01	4.69	89.2	3.86	32.8
LSD (P<0.01)									
	for variety	0.023	0.02	NS	NS	0.023	0.02 (P<0.05)	0.16	NS
	for storage	0.04	0.03	NS	NS	0.03 (P<0.05)	0.05	0.25	NS

Results are expressed as means for three observations for chemical composition and rehydration ratios whereas for organoleptic quality for 8 judges.

The dried fruits were first rehydrated for 10, 20, 30, 40 min. by soaking in cold (8°) water (10g dried flesh in 100 ml water), then the weight after rehydration was divided by the weight of original dried sample to obtain rehydration ratio. On the basis of these observations, the optimum time of 30 min was confirmed for rehydration of both varieties of Jamun fruit (results not shown). The rehydration ratios were comparatively higher ( $p<0.01$ ) in 'raa' fruit than that of 'desi' variety. Further deterioration in rehydration quality was observed with the advancement of storage of dried fruits (Table 2). This loss in rehydration quality may be due to protein denaturation caused by Maillard reaction during extended period of storage of dried product [6]. The overall rating of acceptance scores decreased from 36 to 29 in 'raa' and from 35 to 30 in 'desi' fruit variety during storage of 180 days. A similar loss in sensory quality was noted in guava fruit after dehydration when stored at 37° [7].

It is concluded that the fresh 'raa' Jamun was found to be superior to desi variety with respect to flesh yield and ascorbic acid content. During storage pH, ascorbic acid, reducing sugar and sucrose decreased while moisture increased in both varie-

ties. Though sensory scores of dried Jamun decreased somewhat during storage, the dehydrated flesh of both the varieties remained equally good in acceptability.

**Key words:** Dehydration, Flesh yield, Ascorbic acid.

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