Journal of Postharvest Technology
2020, **08**(2): 18-21
www.jpht.in

RESEARCH ARTICLE

Organoleptic and nutritional quality evaluation of jackfruit bulbs preserved in sugar syrup

T. Uma Maheswari*, Vidhu Valsan, J. Padmanaban

Department of Horticulture, Faculty of Agriculture, Annamalai University, Annamalainagar, Tamil Nadu- 608 002

Received: 30.01.2020 Accepted: 11.03.2020

ABSTRACT

The experiment was conducted in a completely randomized design with jackfruit bulbs preserved in four formulations with variations in sugar concentration and five replications (T_1- 89 %, T_2-76 %, T_3- 63 %, T_4-50 %). The effect of the processing on the nutritional quality and sensory quality, storage life and cost economics was also calculated in this study. The sensory evaluation was carried out monthly for a period of six months during storage. Results revealed that, the bulbs preserved in 89 % sugar syrup(T_1) was considered as the best treatment when compared to others with an ascorbic acid content of 3.64 mg/100g, carotenoids of 4.23 mg/100g and fat content of 2.32 g. Treatment T_1 observed as a sample with maximum shelf life period of five months. The average sensory scores for taste (8.6), colour (8.4), flavour (8.4) and overall acceptability (8.6) of jackfruit bulbs preserved in sugar syrup was initially maximum in T_1 formulated with 89% of sugar concentration. The same trend was maintained in all months of evaluation with gradual reduction in scores. Cost of production of bulbs preserved in sugar syrup was estimated with the benefit cost ratio of 1.49.

Keywords: Jackfruit bulbs, preservation, sugar syrup

Citation: Maheswari, T.U., Vaisan, V., and Padmanaban, J. 2020. Organoleptic and nutritional quality evaluation of jackfruit bulbs preserved in sugar syrup. *Journal of Postharvest Technology*, **8** (2): 18-21.

INTRODUCTION

Jackfruit (*Artocarpus heterophyllus* Lam.) belongs to the family Moraceae, can be considered as the largest fruit among the edible fruits. The fruit is very soft in nature easily digestible flesh and made up of simple sugars like fructose and sucrose that when eaten replenishes energy and revitalizes the body instantly. Jackfruit is rich in dietary fibre, which makes it a good bulk laxative. The fiber content helps to protect the colon mucous membrane by binding to and eliminating cancer-causing chemicals from the colon. The fresh fruit has small but significant amounts of vitamin-A, and flavonoid pigments such as *carotene-ß, xanthin, lutein, and cryptoxanthin-ß*. Jackfruit is a good source of antioxidant vitamin-C, provides about 13.7 mg or 23% of RDA. It is one of the rare fruits that is rich in a B-complex group of vitamins. It contains outstanding amounts of vitamin B-6 (pyridoxine), niacin, riboflavin, and folic acid. Further, fresh fruit is a good source of potassium, magnesium, manganese, and iron. The fruit is perishable and in every year, a considerable amount of jackfruit specially obtained in the glut season (June-July) goes waste due to lack of proper postharvest knowledge during harvesting, transporting and storing both in quality and quantity. Proper postharvest technology for prolonging shelf -life is therefore necessary. Hence an experiment was conducted to study the quality evaluation of jackfruit preserved in sugar syrup.

* *For correspondence:* T.U. Maheswari, (Email: umahorti2003@gmail.com)
ISSN: 2348-4330

MATERIALS AND METHODS

The present investigation was carried out in the Department of Horticulture, Annamalai University, Annamalai Nagar in the year 2018. The experiment was conducted in a completely randomized design with jackfruit bulbs preserved in four formulations with variations in sugar concentration and five replications (T_1- 89 %, T_2-76 %, T_3- 63 %, T_4-50 %).The effect of the processing on the nutritional quality and sensory quality, storage life and cost economics was calculated. The sensory evaluation was carried out monthly for a period of six months during storage. The Sensory Score was obtained based on nine point Hedonic scale [extremely like (9) to extremely dislike (1)] by 10 number of taste panel members. The sensory parameters evaluated were taste, colour, flavour, overall acceptability. The crisp bulbs of the ripe Jackfruit were used for preserving in sugar syrup. The seeds were removed from the bulbs. Sugar syrups were prepared separately and then preserved either as whole. Estimation of ascorbic acid, fat and carotenoids was carried out by the methods of AOAC (1990).

RESULTS AND DISCUSSION

The bulbs preserved in sugar syrup were subjected to organoleptic evaluation at every one month interval during the storage period. Hedonic 9 point scale was used to assess the quality attributes viz., taste, colour, flavour and overall acceptability. From the scoring, it was fund that, the average sensory scores for taste (8.6), colour (8.4), flavour (8.4) and overall acceptability (8.6) of jackfruit bulbs preserved in sugar syrup was initially maximum in T_1 formulated with 89% of sugar concentration. The same trend was maintained in all months of evaluation with gradual reduction in scores. The bulbs treated with 89% of sugar considered as the best treatment with high ascorbic acid (3.64 mg/100g) and slightly low amount of carotenoids (4.23 mg/100g) with low amount of fat content (2.32g) (Table 1). Panellists also concluded that the taste, colour, flavour and overall acceptability were higher in T_1 (Table 2). Storage life was also maximum in this formulation (five months). Cost of production of bulbs preserved in sugar syrup was estimated with a net profit of Rs.66.54 and the benefit cost ratio of 1.49.The physical damage or injury caused by preparation operations increases the rates of respiration and ethylene production, and associated increases occur in the rates of other physical and biochemical reactions responsible for changes in colour (browning), flavour, texture and nutritional quality of the preserved bulbs.

Table 1. Effect of variation in Sugar concentration on nutritional quality of Jackfruit Bulbs preserved in Sugar syrup

Treatments	Ascorbic Acid (mg/100g)	Carotenoids (mg/100g)	Fat Content (g)
T_1 (89%)	3.64	4.23	2.32
T_2 (76%)	3.54	3.87	2.38
T_3 (63%)	3.24	3.91	2.54
T_4 (50%)	3.27	3.76	2.87
S.Ed	0.03	0.08	0.01
CD (P=0.05)	0.07	0.17	0.03

Table 2. Sensory Scoring for Jackfruit bulbs in sugar syrup at 3rd Month of Evaluation

	T_1 (89% of sugar)				T_2 (76% of sugar)				T_3 (63% of sugar)				T_4 (50% of sugar)			
Taste panel (TP)s	Taste	Colour	Flavour	Overall accepta	Taste	Colour	Flavour	Overall accepta	Taste	Colour	Flavour	Overall accepta	Taste	Colour	Flavour	Overall accepta
TP1	7.0	7.0	6.0	7.0	6.0	7.0	8.0	7.0	5.0	6.0	6.0	5.0	3.0	3.0	2.0	3.0
TP2	6.0	7.0	8.0	8.0	6.0	7.0	6.0	7.0	4.0	5.0	4.0	5.0	2.0	3.0	2.0	3.0
TP3	6.0	8.0	7.0	6.0	7.0	6.0	7.0	6.0	6.0	5.0	5.0	5.0	3.0	2.0	2.0	2.0
TP4	7.0	7.0	7.0	6.0	8.0	6.0	6.0	7.0	5.0	4.0	5.0	4.0	2.0	3.0	3.0	2.0
TP5	8.0	6.0	6.0	8.0	6.0	8.0	8.0	8.0	5.0	5.0	4.0	5.0	1.0	2.0	3.0	2.0
TP6	7.0	8.0	7.0	7.0	6.0	6.0	7.0	7.0	4.0	5.0	4.0	6.0	1.0	2.0	3.0	2.0
TP7	7.0	7.0	6.0	6.0	7.0	6.0	7.0	7.0	5.0	4.0	6.0	6.0	2.0	1.0	2.0	2.0
TP8	6.0	7.0	6.0	7.0	7.0	7.0	6.0	6.0	4.0	4.0	4.0	5.0	3.0	2.0	3.0	2.0
TP9	6.0	6.0	8.0	7.0	7.0	6.0	7.0	7.0	4.0	5.0	5.0	4.0	3.0	2.0	1.0	2.0
TP 10	7.0	7.0	7.0	6.0	6.0	7.0	7.0	7.0	6.0	4.0	6.0	4.0	2.0	3.0	2.0	3.0
Average	**6.7**	**7.0**	**6.8**	**6.8**	**6.6**	**6.6**	**6.9**	**6.9**	**4.8**	**4.7**	**4.9**	**4.9**	**2.2**	**2.3**	**2.3**	**2.3**

Skin browning of bulb is due to oxidation of polyphenols and formation of dark coloured pigments (Cia et al., 2006; Cocci et al., 2006). As the product tissues were still alive, moisture was reduced due to respiration resulting in physiological loss in weight (Wills and Golding, 2016).Ascorbic acid and carotenoids are lipid soluble, and are less affected than water-soluble nutrients by processing steps such as washing and blanching, as well as cooking. Vitamin C (ascorbic acid) was probably the most unstable vitamin, and it is readily oxidized by many non-enzymatic processes. It was easily oxidized and will be drastically reduced in a short period of time (Lozano, 2006). Ascorbic acid (AA) has an important role as a phytochemical, due to its functionality as an antioxidant besides its vitamin C activity (Saxena et al., 2008). Among the treatments, bulbs treated with 89 % of sugar secured the highest score for taste, colour, flavour, and overall acceptability. Increase in concentration of sugar improves the taste and quality of the produce. It was evident that TSS value of the processed products was much higher than the status found in raw material and it might be due to the use of different degree of sugar solutions used in the experiments. The pH value of processed products was more or less similar to that of the raw material. Ascorbic acid, carotenoids status and other nutrition of the processed products were much lower than the status found in raw material. These differences may be due to heat used in pasteurization and easily degradation characters of vitamins. The moisture content of the raw material was higher than that of the processed products. The lower moisture content of the processed products might be due to heat used in cooking and pasteurization. This is in accordance with the findings of Mondal et al. (2013).

Table 3. Cost economics of bulbs in sugar syrup

Descriptions	Quantity	Rate (Rs)
Jackfruit bulbs(g)	1kg	100.00
Water (l)	1.6 litre	32.00
Sugar (g)	1.1kg	44.00
Total		Rs.176.00
Cost of Packaging material		Rs.35.00
Labour cost		Rs.187.50
Total variable cost for 1 hr.		Rs.132.83
Total fixed cost		Rs.0.63
Total cost of production		Rs.133.46
Sale of product/kg		Rs.200.00
Net Profit		Rs.66.54
Benefit Cost Ratio		1.49

Benefit cost ratio of jackfruit bulbs preserved in sugar syrup production was calculated as 1.49 (Table 3). It is highly favourable to take this value addition activity and therefore, the preservation of jackfruit bulbs in sugar syrup can be recommended for commercial exploitation.

REFERENCES

A.O.A.C. 1990. Official Methods of Analysis. Association of Official Analytical Chemists, Arlington

Cia, P, Benato E.A, Sigrist J.M, Sarantopóulos C, Oliveira L.M, and Padula M. 2006.Modified atmosphere packaging for extending the storage life of 'Fuyu' persimmon. Postharvest Biology and Technology, **42**(3): 228-234.

Cocci, E., Rocculi, P.S., Romani, P., and Dalla Rosa, M. 200).Changes in nutritional properties of minimally processed apples during storage. Postharvest Biology and Technology, **39**(3): 265-271.

Lozano J.E. 2006. Fruit manufacturing. Business Media, LLC, p. 435.

Mondal, C., Remme R.N., Mamun, A.A., Sultana, S., Ali, M.H., and Mannan, M.A. 2013. Product development from Jackfruit (Artocarpus heterophyllus Lam.) and analysis of nutritional quality of the processed products. Journal of Agriculture and Veterinary Science, **4**: 76-84.

Saxena, A., Bawa A.S. and. Raju, P.S. 2008. Phytochemical changes in fresh-cut jackfruit (Artocarpus heterophyllus Lam.) bulbs during modified atmosphere storage. Food Chemistry, **115**(4): 1443-1449.

Wills, R. and Golding, J. 2016. Postharvest: an introduction to the physiology and handling of fruit and vegetables, UNSW press.