

## Physico-chemical Quality Changes in Guava Jamun Chutney During Storage

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The guava-jamun chutney was developed and evaluated for changes in its chemical constituents and quality parameters at monthly intervals for three months storage period. Total sugars increased significantly, while anthocyanins and ascorbic acid decreased significantly in all the blended products with the advancement in storage period. The colour and appearance, flavour, texture and overall acceptability of guava-jamun chutney decreased significantly with the advancement in storage duration, however, their overall scores remained above the acceptable level even after three months storage. Chutney prepared with 60 guava: 40 jamun pulp ratio was found most acceptable.

**Keywords:** Guava, jamun, blends, chutney, chemical constituents, organoleptic quality, storage.

Guava (*Psidium guajava* L.) belongs to family Myrtaceae and is one of the most common fruits grown under tropical and sub-tropical climate. It is fifth important fruit in India and is known as 'poor man's apple'. The guava fruits are usually round or oval depending upon the species and are available in plenty at a low price during fruiting seasons. The fruits are rich in dietary fibre, vitamin C, folic acid and minerals mainly potassium, copper and manganese. The fruit is a rich source of vitamin C after barbadose cherry and aonla. Guava is effective against cancer, bacterial infections, inflammation and pain. It is considered to be as an excellent fruit for salad, jam, jelly, chutney fruit cheese, squash, etc. It can be processed into different value added products to minimize losses and stabilize prices.

The black plum or Indian blackberry, commonly known as Jamun (*Syzygium cumini* L.) is also an important member of family Myrtaceae. Its fruits are oblong, ovoid and crimson black in colour at ripened stage. It is widely grown throughout India and other tropical and sub-tropical countries.

Jamun fruits are used in *Ayurveda* and *Unani* systems of medicine. Its fruits and leaves are used for curing stomach disorder, whereas seed powder and juice are used for curing diabetes. Fruits are stomachic and diuretic apart from having cooling and digestive properties. These are also used as herbal medicine from ancient age and are reported to be beneficial for diabetic persons. Jamun fruits also show antioxidant property which is due to flavonoids and anthocyanins present in it.

Jamun fruits are highly perishable in nature and are available only for a very short duration during June-July. The ripe fruits are generally consumed in fresh form. The surplus

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produce can also be processed into value added products like jam, jelly, chutney, sauce, spread, cheese and toffee. Jamun juice, being acidic and astringent in taste, has not been used much and is yet to pick up the impetus for its utilization in processing.

Blending of pulp/juice from two or more fruits improves the colour and appearance, flavour, taste, mouth feel, overall acceptability and nutritional value of processed products. Therefore, blending of jamun pulp/juice with guava pulp can supplement their blended products with vitamins, minerals, besides improving colour, flavour, taste and overall acceptability. Keeping all these aspects in view, the present study was planned with the objectives to standardize appropriate combination of guava-jamun blends for preparation of chutney, and also to evaluate storage quality of blended products.

#### MATERIALS AND METHODS

The present investigation was carried out in Fruits and Vegetables Processing Technology Laboratory of Centre of Food Science and Technology, CCS Haryana Agricultural University, Hisar during the year 2012-13. Uniformly ripe guava and jamun fruits were procured from local market of Hisar.

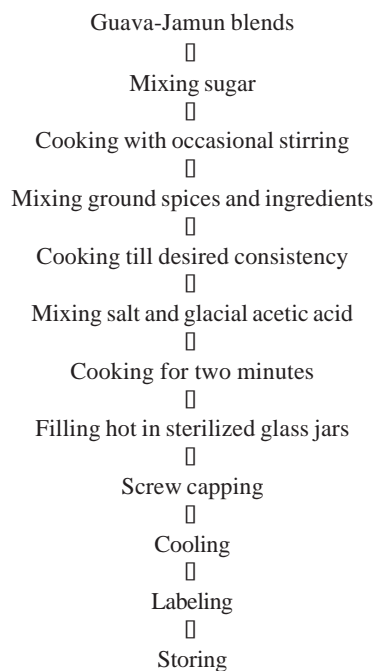
Chutney was prepared by cooking 1 kg pulp, 450 g sugar, 40 g salt, 5 g red chilli powder, 8 g hot spice mix, 400 g onion paste, 20 g ginger paste, 10 g garlic paste and 5 ml glacial acetic acid. Prepared chutney was filled hot in clean, sterilized 150 g capacity glass jars, screw capped properly, cooled in air, labelled and stored at room temperature for three months.

Guava-Jamun chutney was analyzed for changes in chemical constituents and sensory acceptability at monthly interval for three months. Total and reducing sugars were estimated by the method of Hulme and Narain (5). Acidity was analyzed by titration against 0.1N sodium hydroxide (Ranganna, 10), while pH of the product was recorded by pH meter (Model: CL 54 Digital Toshniwal Instruments Mfg. Pvt. Ltd., India). Ascorbic acid was analyzed by AOAC (2) method. Anthocyanins were extracted with ethanolic HCl and measured at 535 nm wavelength, while total phenols were analyzed by the method of AOAC

(2). The overall acceptability of guava-jamun chutney was based on mean scores obtained for all the sensory characters *i.e.*, colour and appearance, texture, flavour, taste and mouth feel. The characters with mean scores of 6 or above out of 9 were considered acceptable. The treatments were replicated thrice and the data were analyzed statistically using completely randomized design. The critical difference value at 5 per cent level of significance was used for making comparison among different treatments during storage.

#### RESULTS AND DISCUSSION

There was a significant increase in total sugars of guava-jamun chutney with the advancement of storage period. The increase in level of sugars during storage might be due to hydrolysis of polysaccharides like pectin and starch into simple sugars. The results are in agreement with those of Mishra *et al.* (9) in ready-to-eat aonla chutney and Dhamul *et al.* (4) in custard apple toffee. Anthocyanins decreased significantly in guava-jamun chutney during three months storage period. Anthocyanins are phenolic compounds which are highly volatile and are easily



**Fig. 1.** Flow sheet for preparation of guava-jamun chutney

**Table 1.** Changes in Total sugars (%) of the chutney during storage

Guava:Jamun	0	1	2	3
100:00	41.11	42.24	42.52	42.77
80:20	41.03	41.50	41.87	42.29
60:40	40.32	41.23	41.49	41.87
40:60	39.63	41.06	41.19	41.42
20:80	38.60	40.33	41.04	41.19
00:100	37.50	39.60	39.93	40.37

\*C.D for storage is 0.24

**Table 2.** Changes in Anthocyanins (mg/100g) of the chutney during storage

Guava:Jamun	0	1	2	3
100:00	2.53	2.11	1.65	1.20
80:20	13.41	11.82	9.50	7.83
60:40	30.17	27.64	22.44	20.68
40:60	41.60	37.71	34.13	31.40
20:80	53.67	50.84	48.71	45.65
00:100	73.44	70.31	63.90	58.92

\*C.D for storage is 0.52

**Table 4.** Changes in Color and appearance score of the chutney during storage

Guava:Jamun	0	1	2	3
100:00	8.31	8.00	7.71	7.35
80:20	8.70	8.34	8.10	7.79
60:40	8.77	8.39	8.32	8.09
40:60	8.73	8.13	7.70	7.31
20:80	8.72	8.10	7.33	7.16
00:100	8.30	7.74	7.20	7.04

\*C.D for storage is 0.5

**Table 6.** Changes in Flavor score of the chutney during storage

Guava:Jamun	0	1	2	3
100:00	8.11	7.91	7.39	7.30
80:20	8.60	8.32	8.17	7.70
60:40	8.90	8.47	8.21	7.91
40:60	8.97	8.04	7.80	7.70
20:80	8.91	8.43	8.07	7.19
00:100	8.22	7.64	7.32	7.14

\*C.D for storage is 0.38

oxidised. These might also have decreased due to their condensation into brown pigments during storage. Similar results were reported by Kannan and Thirumaran (6) in jamun products and Amaro *et al.* (1) in strawberry jam. The ascorbic acid content also decreased significantly in blended chutney during storage. This may be due the fact that it is sensitive to light and oxygen and gets readily oxidized. Similar reduction in ascorbic acid was recorded by Muhammad *et al.* (8) in apple jam, Souad *et al.* (11) in watermelon waste jam and Bhuiyan (3) in fresh hog plum chutney. A significant

**Table 3.** Changes in Ascorbic acid (mg/100g) of the chutney during storage

Guava:Jamun	0	1	2	3
100:00	26.91	24.2	21.61	17.32
80:20	24.26	19.12	14.74	11.30
60:40	19.19	16.51	13.00	10.41
40:60	14.72	11.33	8.72	6.14
20:80	9.54	8.70	6.17	3.53
00:100	6.19	5.04	2.72	1.20

\*C.D for storage is 1.27

**Table 5.** Changes in Texture score of the chutney during storage

Guava:Jamun	0	1	2	3
100:00	8.93	8.71	8.38	8.13
80:20	8.90	8.70	8.32	8.10
60:40	8.95	8.78	8.58	8.34
40:60	8.40	8.01	7.79	7.31
20:80	8.55	8.09	7.73	7.40
00:100	8.47	8.06	7.38	7.30

\*C.D for storage is 0.43

**Table 7.** Changes in Overall acceptability score of the chutney during storage

Guava:Jamun	0	1	2	3
100:00	8.31	8.00	7.73	7.41
80:20	8.80	8.43	8.10	7.73
60:40	8.90	8.47	8.21	7.90
40:60	8.91	7.95	7.72	7.54
20:80	8.92	7.84	7.52	7.13
00:100	8.52	7.71	7.33	7.10

\*C.D for storage is 0.18

decrease in colour and appearance, texture, flavor and overall acceptability of guava-jamun chutney was recorded during three months storage period, however, organoleptic score of all the blended products remained above the acceptable level even after three months of storage. This might be due to changes in chemical constituents or certain enzymatic and non-enzymatic changes in the products. The present findings are in conformity with those of Khan *et al.* (7) in strawberry jam and Verma and Chopra (12) in aonla-mango mixed fruit slab.

### REFERENCES

1. Amaro, L.F., Soares, M.T., Pinho, C., Almeida I.F., Ferreira, I.M.P.L.V.O. and Pinho, O., Influence of Cultivar and Storage Conditions in Anthocyanin Content and Radical-Scavenging Activity of Strawberry Jams. *World Acad. Sci., Engg. Tech.* 2012; **69**: 118-122.
2. A.O.A.C. "Official Methods of Analysis". Association of Official Analytical Chemists. Washington, D.C. 15<sup>th</sup> edition, 1990.
3. Bhuiyan, M.H.R., Pickle and Chutney Development from Fresh Hog Plum (*Spondias dulcis*). *J. Environ. Sci. Nat. Res.* 2012; **5**(2): 67-72.
4. Dhamul, N.S., Adsule, R.N. and Kotecha, P.M., Effect of different levels of sugar and skim milk powder in the chemical composition and sensory properties of custard apple toffee. *Indian Food Packer* 1996; **50**(1): 19-21.
5. Hulme, A. C. and Narain, R. The ferricyanide method for determination of reducing sugars. A modification of Hagedorn-Jensen-Hanes technique. *Biochem. J.* 1931; **25**: 1051-1061.
6. Kannan, S. and Thirumaran, A.S., Studies on storage life of jamun (*Syzygium cumini* Rom.) fruit products. *J. Food Sci. Technol.* 2004; **41**(2): 186-188.
7. Khan, R.U., Afridi, S.R., Ilyas, M., Sohail, M. and Abid, H., Development of strawberry jam and its quality evaluation during storage. *Pakistan J. Biochem. Mol. Biol.* 2012; **45**(1): 23-25.
8. Muhammad, A., Durrani, Y., Zeb, A., Ayub, M. and Ullah, J., Development of diet jam from apple grown in swat (nwfp). *Sarhad J. Agric.* 2008; **24**(3): 461-467.
9. Mishra, P., Verma, M., Mishra, P., Mishra, S. and Rai, G.K., Studies on development of ready to eat amla chutney and its preservation using class one preservatives. *American J. Food Technol.* 2011; **6**(3): 244-252.
10. Ranganna, S. *Handbook of Analysis and Quality Control for Fruit and Vegetable Products*. Tata McGraw Hills Publishing Co. Ltd., New Delhi, 2003.
11. Souad, A.M., Jamal, P. and Olorunnisola, K.S. Effective jam preparations from watermelon waste. *Int. Food Res. J.* 2012; **19**(4): 1545-1549.
12. Verma, G. and Chopra, C.S., Preparation and preservation of aonla-mango mixed fruit slab. *Beverage & Food World* 2010; **37**(1): 60-61.