



Standardization and Storage Stability of Amla Sweet Candy

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Amla fruit is known for its antioxidant activity (Vitamin C) and medicinal properties. Value added products make the fruit available throughout the year and helps to promote the use of amla among the public. Hence an attempt was made to standardize sweet candy with different blanching time viz., 5, 10 and 15 minutes. The prepared sweet candies were standardized on the basis of sensory evaluation. Among these, candies prepared with 10 minutes blanching time treatment was found to be the best. Prepared sweet candy was packed in 300 gauge polythene bag and stored at room temperature to study the storage stability. The chemical characteristics of the amla sweet candy were analysed during storage period.

Key words: sweet candy

Amla or Indian gooseberry (*Emblica officinalis* G.) belongs to the family *Euphorbiaceae* and is one of the important fruits indigenous to India. Amla fruit is sour and astringent in taste, hence it is not popular as a table fruit. The excellent nutritive and therapeutic value of fruit has great potentiality for processing into value added products. The fruit has been utilized to develop several value added products like ready to serve beverage, nectar (Ram, 1984), murabba, pickle, candy (Pathak, 1988), herbal squash, herbal jam, sauce and fruit toffee (Singh, 1997). Amla is a perishable product, therefore it is essential to extend its shelf life for prolonging the supply to the processing industry so the commercial utilization of this fruit could be established. The present investigation was conducted to study the standardization and storage studies of amla sweet candy.

Materials and Methods

Selection of Amla fruits

Fresh, mature amla fruits (variety Kanchan) were procured from local market of Madurai city.

Standardization of Amla Sweet Candy

Standardization of sweet candy was tried with variations in blanching time viz., 5, 10 and 15 minutes. The prepared sweet candies were standardized on the basis of sensory evaluation with special reference to organoleptic attributes viz., colour and appearance, flavour, texture, taste and overall acceptability. Among these, candies prepared with 10 minutes blanching time was found to be the best.

Storage Studies

The sweet candy was packed in polyethylene bag (300 gauge) and stored at room temperature to

assess the storage behaviour of the product during storage period.

Physico-chemical analysis

The physico-chemical characteristics of the standardized amla sweet candy was analysed once in 30 days for nine months. The TSS of amla candy was recorded with the help of Hand Refractometer and the acidity was determined by titrating against standard sodium hydroxide solution using phenolphthalein as an indicator and expressed as anhydrous citric acid (Ranganna, 1995). The pH was determined in digital type pH meter (Hart and Fischer, 1971). Vitamin C content was determined by titrating it against 2, 6-dichlorophenol indophenols dye (Mahadevan and Sridhar, 1982). The reducing and total sugars were determined by the method as described by Ranganna (1995).

Microbial load

The microbial load of the stored amla sweet candy was enumerated by the standard method. The microbial load of candy was enumerated by the method described by Istavan kiss (1984).

Sensory analysis

The prepared product was evaluated using a nine point hedonic scale to assess the colour and appearance, flavour, taste, texture and overall acceptability of the amla sweet candy by a panel of ten trained judges and it was accepted by all (Watts et. al. 1989).

Results and Discussion

Chemical characteristics of amla sweet candy

A gradual decreasing trend in moisture content was observed throughout the storage period (Table 1). The initial moisture content of amla sweet candy

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Table 1. Changes in chemical composition of amla sweet candy during storage period

Chemical Characteristics	Storage period (in months)									
	0	1	2	3	4	5	6	7	8	9
Moisture (%)	22.14	21.06	21.01	20.98	20.54	20.11	19.68	18.92	18.70	18.53
Acidity (%)	0.69	0.72	0.74	0.74	0.75	0.78	0.80	0.81	0.81	0.82
pH	3.44	3.44	3.43	3.41	3.41	3.40	3.39	3.38	3.38	3.38
TSS (°Bx)	58.20	58.16	58.15	58.15	58.00	57.80	57.45	57.16	57.10	57.10
Total sugar (%)	45.74	45.71	45.69	45.69	45.68	45.63	45.52	45.40	45.28	45.13
Reducing sugar (%)	37.32	37.34	37.37	37.40	37.48	37.61	37.74	37.80	37.84	37.96
Vitamin C (mg/100g)	504.74	504.31	504.16	504.02	503.86	503.63	503.30	503.08	502.75	502.24
Tannin (%)	0.734	0.731	0.727	0.727	0.726	0.724	0.719	0.715	0.714	0.709
Calcium (mg/100g)	36.48	36.44	36.42	36.39	36.34	36.34	36.29	36.23	36.20	36.14
Phosphorous(mg/100g)	8.56	8.54	8.50	8.47	8.43	8.37	8.36	8.33	8.33	8.28
Iron (mg/100g)	0.98	0.98	0.96	0.93	0.92	0.89	0.89	0.86	0.82	0.80
Crude fibre (%)	2.16	2.15	2.15	2.13	2.10	2.09	2.06	2.04	1.99	1.93

was 22.14 g per cent which was gradually decreased to 21.06, 20.98 and 20.11 g per cent in first, third and fifth month of storage period. At the end of the storage method, the moisture content was decreased to 18.53 g per cent. Sagar *et al.* (2000) observed a rapid change in moisture content of mango powder upto two months of storage at ambient and low temperatures. This may be due to changes in weather conditions during storage. In amla sweet candy, the initial acidity was 0.69 g per cent and there was a slight increase to 0.82 g per cent during storage period. Firoz *et al.* (2003) observed that the total acid content of pulse based papaya powder was decreased upto second month of storage packed in glass bottles. During storage a significant decrease in acid content of guava powder in all varieties was reported by Kalsi and Dhawan (2001). Dabhade and Khedkar (1980) also reported similar results for mango powder. Table 1 summarizes the changes noted in the pH of the amla sweet candy during the study period. A very slight change was observed (3.44 to 3.38) throughout the storage study. Similarly total soluble solids (TSS) and total sugar decreased from 58.20 to 57.10° bx and 45.74 to 45.13 g per cent respectively.

Likewise the reducing sugar content of sweet candy was 37.32 and it increased to 37.96 g per cent in the last month of the storage period. Chitra and Manimegalai (2002) reported that the banana soya blended weaning food mix showed an increase in the reducing sugar content at the end of the storage period. Similar picture was noted in the present investigation too. The initial vitamin C and tannin were 504.74 mg / 100g and 0.734 g per cent and it decreased to 502.24 mg/100g and 0.709 g per cent at the end of the storage period. Similarly calcium, phosphorous, iron and crude fibre showed a decreasing trend during storage period. Significant variations in calcium, phosphorus and iron contents of different mango powder samples were observed by Kesarwani *et al.* (2000). It may be attributed to

agro-climatic conditions, genetic factors and leaching of minerals during preparation of mango powder (Dabhade and Khedkar, 1980). In this study negligible changes was noted in the mineral content of the stored samples.

Microbial load of amla sweet candy

The microbial load of the amla sweet candy was analysed at regular intervals (90 days) till the end of the storage period of nine months and presented in Table 2.

Table 2. Changes in microbial load of amla sweet candy during storage period

Storage period (in days)	Microbial population		
	Bacteria (X 10 ⁻³ /g)	Fungi (X 10 ⁻² /g)	Yeast (X 10 ⁻² /g)
Initial day	1	1	1
90	2	1	2
180	2	2	2
270	4	3	3

The amla sweet candy showed a very slight increase in microbial load during the storage period. The initial bacterial, fungi and yeast counts were 1x10⁻³g, 1x10⁻²g and 1x10⁻²g respectively, which had increased to 4x10⁻³g bacterial counts, 3x10⁻²g fungal count and 3x10⁻² g yeast count at the end of the storage period. The meager increase in the microbial count indicated that the pre processing, processing and storage might have been in a hygienic condition and so the environment was not found suitable for rapid microbial growth.

Organoleptic characteristics of Amla sweet candy

The organoleptic scores slightly decreased with an increase in the storage period. The organoleptic scores of colour, appearance, texture, taste and overall acceptability were 8.9, 8.8, 8.6, 8.8 and 8.7 respectively at initial study period (Table 3).

Amla sweet candy had attractive colour, fine in texture and good taste. The colour, appearance and taste of the amla sweet candy was highly acceptable by the panel members. After nine months of storage

Table 3. Organoleptic evaluation of amla sweet candy during storage

Storage period (in days)	Organoleptic characteristics				
	Colour	Appearance	Texture	Taste	Overall acceptability
Initial day	8.9	8.8	8.6	8.8	8.7
90	8.6	8.6	8.3	8.6	8.5
180	8.2	8.3	8.0	8.2	8.1
270	8.0	7.9	7.8	8.0	7.9

the organoleptic scores of amla sweet candy was recorded as 8.0, 7.9, 7.8, 8.0 and 7.9 for colour appearance, texture, taste and overall acceptability. The present study showed a reduction in the organoleptic score as the storage period increased irrespective of packaging materials and climatic conditions.

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