

PREPARATION OF JELLY FROM FRUITS OF *FICUS GLOMERATA* ROXB.**Manjusha D. Alure**

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ABSTRACT

In Indian forests occur a wide variety of fruits and vegetables. Now, India is the second largest producer of fruits and vegetables in world production (Patil et al., 2013). Vegetables and fruits serve as important and indispensable source of vitamins and minerals such as Calcium, Phosphorus, Iron and many other constituents (Kowalski et al., 2013). Post harvest losses of fruits are more series in developing country like India and total losses from harvest to consumer point are as high as 30-40%, which is worth of thousands of crores rupees. Fruit and vegetable processing is necessary where it ensures fair returns to the processors/growers to improve their economic condition. It also helps to mitigate the problem of under employment. The perishable fruits and vegetables are available as seasonal surpluses during certain parts of the year and are wasted in large quantities due to absence of facilities and know-how for proper handling, marketing and storage. Furthermore, massive amount of the perishable fruits and vegetables produced during particular season results in a glut in the market and became scare during other seasons (Ravani & Joshi, 2014). Developing fruit and vegetable based forest enterprise/entrepreneurship is an ideal development in poor communities as they have the potential to generate income and employment, while supporting sustainable management of the forests. *Ficus glomerata* Roxb. is a species belongs to family Moraceae. It is commonly called the cluster fig tree, Indian fig tree or goolar (gular) fig. This is native to Australia, Malaysia, Indo-China and the Indian subcontinent. It is unusual in that its figs grow on or close to the tree trunk, termed cauliflory. The confectionery product are highly popular among the children throughout the world due to their taste and flavor. Jelly is one of the sugar based product which is largely consumed by the children. The conventional Jelly are generally made from sugar, Pectin and other synthetic colors and flavors. (Sakhale, 2012) In the present investigation, the efforts have been made to incorporate the natural fig in the jelly to evaluate its quality. In India, less than 2% of fruits and vegetables produced are processed against 65% in the United States (Patil et al., 2013). Therefore, is a great scope to develop skills of local and forest dwelling communities for processing & value addition to the underutilized fruits and vegetables into various product like Jam, Jelly, Candy, Confectionary, Leather, Fruit Bars, Fruit Toffee and dried Fruit and Vegetable product. Also, forest based underutilized fruits are main source of livelihood for forest dwelling and local communities which have potential for commercial exploitation & yet to be utilized for their potential.

Keywords: *Ficus glomerata*, Fruit jelly, Hedonic scale, Shelf life, Pectin

Introduction

The dawn of time, medicinal plants have served as a source of healing for almost all societies. The prevalence of natural goods with therapeutic capabilities has been linked to the usage of herbal treatments and healthcare preparations that are derived from frequently used traditional herbs and medicinal plants, like those documented in ancient scriptures like the Vedas and the Bible.

It has also been widely recognised that traditional medicine and medicinal plants are used as a normative foundation for the preservation of good health in the majority of developing nations. Furthermore, the extraction and creation of several medicines and chemotherapeutics from these plants as well as from conventionally used medical plants has been linked to an increase in the reliance on the usage of medicinal plants in industrialised countries.

A 15-18 m tall, lactiferous, evergreen tree in the Moraceae family called *Ficus glomerata* Roxb.

does not have obvious aerial roots (Citation Varier, 1995). With more than 700 species, *Ficus* is a particularly big pan-tropical genus that is extensively dispersed in the drier regions of Asia, Africa, America, and Australia. Due of the synconia fig and specialist pollinator wasps that make up its distinctive reproductive system, it is kept as a single, huge genus *F. glomerata* often known as "Umbar," is a plant whose entire body is valued for its therapeutic properties in Ayurveda. It has been widely used to treat inflammatory illnesses, diabetes, diarrhoea, jaundice, dysentery, and biliary problems.

Fruits serve as a source of energy, vitamins, minerals, and dietary fibers. One of the barriers in increasing fruit and vegetables consumption is time required to prepare them. Overall, fruit bars have a far greater nutritional value than the fresh fruits because all nutrients are concentrated.

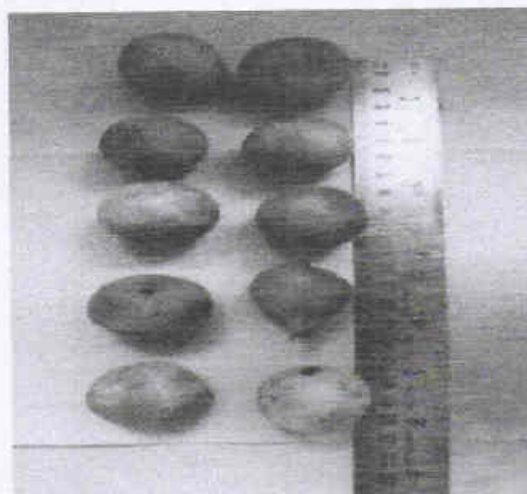
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Fig. Tree of *Ficus glomerata*.Fig. Fruit of *Ficus glomerata*.

Material and methods

Collection of *ficus* fruits

Fully mature large fruits of Umber (Cluster fig) were utilized for the present study and were collected from fields of Nanded. Fruits were graded, sorted and thoroughly washed under running tap water to remove debris. The undamaged fruits with no symptoms of visible discoloration were selected and used for the present study.

Value added product development

Preparation of Jelly

Fresh fruit juice was obtained from umber by adding 70% sugar of total pulp and pectin 1.5% then add citric acid 0.5% and heat up to 68-70 brix. End point was jellu like stickiness it was and spread in the plate and stored at the room temperature for further study.

Umber fruit
Washing
Cutting
Grinding
Juice
Addition of sugar (75%)
Heating
Addition of citric acid (0.5%)
Addition of Pectin powder 1 to 2%
Umber Jelly (end point 68.5°Brix)
filling in bottle and sealing
Storage

Flowchart 1: Flow sheet for preparation of jelly

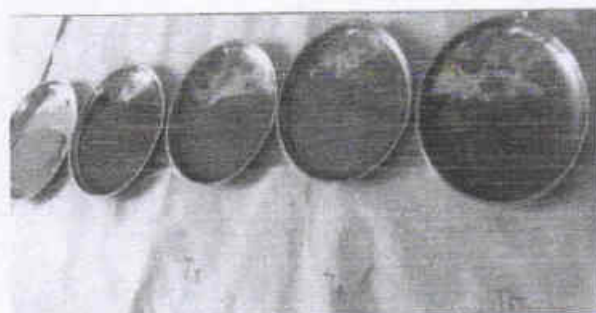
Physicochemical characteristics of jelly

Total soluble content of value added product was measured with the help of digital hand held refractometer. Acidity was estimated by titrating

against standard alkaline solution using phenolphthalein indicator and was expressed in percentage in temperature of citric acid (AOAC table). Total sugars were estimated by Fehling's solution (Copper reduction) as suggested by Lane (1923). The pH was measured by PH meter. Protein contain was estimated as per the method of Kjeldhal methods (AOAC 1990)

Sensory evolution

The sensory evolution was done to determine the overall acceptability on a 9- point hedonic scale by a panel of 5 judges as described by Amerine et.al. (1965), the end of storage of the processed product was determined mostly on the basis of sensory quality (sensory rating 7 and above was considered good). Microbiological analysis of processed product determined by counting colony forming units (cfu/g or ml) (10-fold dilution series in cold water). bacteria grown on nutrient agar medium were incubated for 4 days at 34° C.

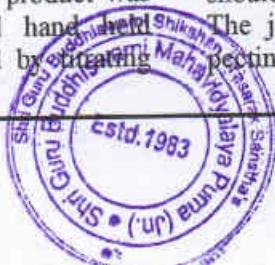
fig. Jelly prepared from *Ficus glomerata*.

Results for jelly

Jellies are made from the strained juice of fruit. Jelly should be crystal clear and shimmering. It should hold its shape but be soft enough to spread. The jellies were made from the fruit juice and pectin with citric acid.

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Sr.	Ingredients	Treatment				
		1	2	3	4	5
1	Fruit juice (ml)	250	250	250	250	250
2	Sugar (g)	135	140	175	180	195
3	Pectin %	0.1	0.2	0.3	0.4	0.5
4	Heating Temp.	70	90	100	120	120
5	Citric Acid	0.5	0.6	0.4	0.5	0.5

Table No 1: Recipe of value added product -Fruit jelly from Cluster fig.

The jelly product was made using juice and boiling with sufficient sugar to a reasonable thick consistency. The jelly was prepared by using pectin and sugar. The jelly was formulated by using different treatments of juice, sugar and pectin. In treatment 1 (T1), jelly was prepared by using 250 ml juice, 135g sugar, pectin 0.1%. The mixture was heated at 70°C. In treatment 2 (T2), jelly was prepared by using 250 ml juice, 140 g sugar, pectin 0.2%. The mixture was heated at 90°C. In treatment 3 (T3), jelly was prepared by using 250 ml juice, 175 g sugar, pectin 0.3%. The mixture was heated at 100°C.

In treatment 4 (T4), jelly was prepared by using 250 ml juice, 180 g sugar, pectin 0.4%. The mixture was heated at 120°C. In treatment 5 (T5), jelly was prepared by using 250 ml juice, 195 g sugar, pectin 0.4%. The mixture was heated at 120°C. The jelly prepared by using treatment (T2) having fruit juice 250ml, sugar 140g, pectin 0.2%, and heating temp 90° C was found to be superior in colour, appearance, texture, taste, flavor and overall acceptability to those prepared by using other combinations. The different treatments for preparation of jelly are summarized in Table no 4.

Name of Product	Protein (%)	Moisture (%)	Ash (%)	pH	TSS Brix
Jelly (fresh)	1.87%	27.25	9.43	3.5	73.5
Jelly (90 days storage)	1.6%	23.45	8.9	3.3	77

Table No 02: Nutritional composition of value added product after preparation: after 90 day's storage

The nutritional composition of cluster fig fresh jelly was protein 1.87 %, Moisture 27.25%, ash 9.43% pH 3.5 and TSS 73.5- while after 90 days of storage protein was 1.6%, Moisture 23.45 %, Ash 8.9 % TSS 77 and pH was 3.3.

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Value added product	Total Sugar (%)	Reducing sugar (%)	Texture
Jelly (fresh)	45.67	31.47	Smooth
Jelly (90 days Storage)	47.88	33.56	Smooth

Table no.3: Physicochemical properties of different value added product

The total sugar in cluster fig fresh jelly total sugar was 45.67 and non reducing sugar was 31.47 % with smooth texture and after 90 days of storage the total sugar was 47.88%, while non reducing sugar was 33.56%.

Product name	Bacterial load 10^{-1} N.A medium log cfu/ml org
Jelly (cluster fig)	7.7

Table No 4: Microbial load of value added product at the end of storage: (90 days storage)

The microbial analysis was carried out at the end of storage as determined on the basis of sensory evaluation. The microbial load (bacteria) in the product was estimated following standard dilution. The visible colonies of bacteria were examined after 24 hrs of inoculation at ambient temperature. The product formulated has more or less similar bacterial load and below permeable limit of food safety.

Name of the product	Storage months (n=3)	Hedonic score in scale (n=5 penalists)
Jelly	4-6 months	8

Table No 5: Storage life of value added product at ambient temperature (30-42° C) on basis of sensory qualities.

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Sr.no	Scale	Liking score
1	Like extremely	9
2	Like very much	8
3	Like moderately	7
4	Like slightly	6
5	Neither like nor dislike.	5
6	Dislike slightly	4
7	Dislike moderately	3
8	Dislike very much	2
9	Dislike extremely	1

Table no 06 : 9 point hedonic scales

Shelf life of value added product was accessed by storing the product up to 3-4 months at ambient temperature. The sensory attributes in terms of hedonic score was good for cluster fig Jelly after 3 months of storage.

Product	Sensory		Texture	Flavor	
	Colour	Appearance		Taste	Overall
Jelly	Brown	Delicious	Smooth	Sweet	7

Table No. 6: Sensory evolution of value Added product

The jelly was evaluated for various sensory quality parameters like color, flavor, texture, mouth feel and overall acceptability by a semi trained panel of 10 judges on a 9-point Hedonic scale (Amerine et al., 1965).

Discussion and Conclusions

In the present study, attempts have been made to standardize the fruit processing method of cluster fig fruits for jelly which will be in compliance with existing food law of Food Safety Standards Authority of India. The cluster fig jelly prepared by using 250 g fruit juice, sugar 150 g, pectin 0.1% was found to be superior. The jelly preparations have been reported by Susana Rubio-Arreaz et al., (2016). Nutritional compositions of value product were suitable for their utility. Also, analysis of physicochemical properties product, showed figure within limit. The sensory evaluation and shelf life of product showed over all acceptance on five point hedonic score The shelf life of all processed product was 4-5 months. Similar results are obtained by Arraz et al. (2016) and Chalwad et al., (2012). From the above, it can be concluded that the selected wild fruits can be processed by using these standardized methodology. So that it will serve as additional source of income for local communities. This would also be useful for starting new enterprises. This information would also be useful to food biotech industries and Govt. of India.

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