



Preparation, Sensory and Storage Evaluation of Ber Candy in India

M. Marimuthu ^{a++}, S. Easwaran ^{a##*}, V. Guhan ^{at†}
and R. Vinoth ^{bt‡}

^a ICAR-Krishi Vigyan Kendra, Sirugamani, Tiruchirappalli-639115, India.
^b Institute of Agriculture, TNAU, Kumulur-621712, India.

Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/IJPSS/2023/v35i93071

Open Peer Review History:

This journal follows the Advanced Open Peer Review policy. Identity of the Reviewers, Editor(s) and additional Reviewers, peer review comments, different versions of the manuscript, comments of the editors, etc are available here: <https://www.sdiarticle5.com/review-history/101128>

Short Research Article

Received: 15/02/2023
Accepted: 18/04/2023
Published: 19/04/2023

ABSTRACT

In the northern hemisphere, ber is a fruit that grows in tropical and subtropical climates. More than 600 species in 50 genera make up the family. The species *Z. jujube* Mill (Chinese date or jujube), *Z. mauritiana* Lamk (Indian date or ber), and *Z. spina christi* (L.) wild (Christ's thorn) are the most significant in terms of range and commercial value. Ber is grown on an estimated 22,000 hectares of land. The yield potential ranges from one to two quintals per tree each year. According to the current research, the organoleptic score of ber candy gradually decreased while being stored at room temperature. Up until nine months, candy was permissible. The product's storage stability is affected by a variety of circumstances. As a result, it is clear that the product loses its organoleptic quality and storage stability after a specific amount of time. Temperature has a significant impact on the product's ability to undergo several metabolic processes.

Keywords: Ber; candy; sugar syrup; storage.

⁺⁺ Subject Matter Specialist (Horticulture);

[#] Subject Matter Specialist (Food Science and Nutrition);

[†] Subject Matter Specialist (Agrometeorology);

[‡] Teaching Assistant;

*Corresponding author: E-mail: esuhort@tnau.ac.in;

1. INTRODUCTION

The fruit known as ber (*Zizyphus mauritiana* Lamk.) is one of India's oldest and most popular fruits. It is a fruit that is most suited for growing in arid and semi-arid areas of India where the majority of other fruits cannot be cultivated either because of inadequate irrigation systems or unfavourable weather circumstances. It is a member of the Rhamnaceae family and is native to India. It is one of the hardy fruit tree and cultivated in Northern parts of India especially in the states of Punjab, Haryana, Rajasthan, Uttar Pradesh and also in Maharastra and Gujrat. 61,284 hectares are all now used for ber farming in India [1]. Ber is a fruit that grows in tropical and subtropical regions of the northern hemisphere. The family has more than 600 species spread across 50 genera. The most significant in terms of distribution and commercial importance are the species *Z. jujube* Mill (Chinese date or jujube), *Z. mauritiana* Lamk (Indian date or ber), and *Z. spina christi* (L.) wild (Christ's thorn). An estimated 22,000 hectares are being used to grow ber [2-4]. One to two quintals per tree are the range of the yield potential. It may be effectively grown in the marginal environment of the subtropics and tropics and is regarded as an under-utilized fruit crop in semi-arid parts of the world [5]. Therefore, it is essential to create the right technology for processing fruits. Thus, the processing of ber into marketable, in-demand products like pulp, juice concentrates, jams, jelly, syrup, ber candy, ber powder, tutti-fruity, slices, and wine will help to extend the shelf life, reduce market oversupply during its peak production season, reduce post-harvest losses, and boost export, which in turn brings in valuable foreign currency and improves the socioeconomic conditions of farmers [6-9]. Among the many methods, candy making has been shown to be practical and suitable for the manufacture of ber candy, however it takes a lot more time.

2. MATERIALS AND METHODS

The feasibility fruit based RTS beverage and spiced candy RTS Beverage from Dried Ber

3. RESULTS AND DISCUSSION

Juice. Dried Ber Juice (DBJ): The "Ber" cultivar Umran, Kaithli were used to preparation of DBJ. The whole fruits were blanched in boiling water for 4 minutes and rinsed in cold water, the blanched fruits were exposed to sulphur dioxide fumes in a sulphur box by burning sulphur powder at the rate of 3.5 to 10g per kg of fruit for 3 hours. The sulphured fruits were dehydrated in a cabinet drier at 60°C ± 50°C temperature to 20 percent moisture content. The dried Ber was cooked with water in the ratio of 1:6 for 60 - 80 min to soften them. The cooked mass was pressed in a twofold muslin cloth to extract juice. The average yield of juice was 200ml per 100g dehydrated fruit. The juice had a pH of 3.75. Total Soluble Solids (TSS) (9.6 Brix and 0.56(g)) percent acidity. The dried ber juice was heated to 80°C filled in to clean sterile bottles, sealed and processed in boiling water 100°C for 10 min and cooled. The RTS beverage was evaluated by a panel of semi trained judges for flavour, taste and appearance.

2.1 Spiced Ber candy

Studies were performed on three cultivars of ber viz, Gola, Umran and Kaithli mature fruits of each cultivar were taken separately for candy preparation. Fruits were washed pricked with help of Fork and fruits were destonned by using cork borer. The destonned fruits were blanched fruits in boiling water for 2 to 5 minutes. These blanched in boiling water for 2 to 5 minutes. These blanched fruits were steeped in the sugar syrup of 40 percent sugar, 1% citric acid and 1.5% spice (cardamon). The fruits were dipped in sugar syrup for 24 hrs. The process was repeated and strength of syrup was raised by 10% to 60% TSS. Finally the syrup of 70% was prepared and treated fruits were allowed to soak for 7-8 days. Then drained and shade dried. Organoleptic quality of the ber candy were evaluated by a panel of 10 judges who scored on a 9-1 scale [10]. The prepared candy was packed in glass jars of ½ kg capacity and stored at ordinary ventilated room conditions during the entire period (February 1996 to December 1996) of study.

Table 1. Composition organoleptic quality of RTS

Variety	OBrix 20°C	Acidity 8%	Organoleptic quality	
			Overall score	Rating
Umran	15.6	0.38	7.4	Like moderately
Kaithli	12.5	0.36	6.8	Like slightly

Table 2. Changes during storage of ber candy (spiced) at ambient Temperature

Storage period Months	TSS (%)	Acidity G (%)	Ascorbic Acid Mg/100g	Organoleptic Score *
1.	75.00	0.30	55.75	8.7
2.	75.00	0.30	50.50	8.7
3.	76.00	0.32	42.68	8.5
4.	76.50	0.32	38.67	8.4
5.	77.00	0.35	36.75	8.1
6.	77.00	0.38	34.26	8.0
7.	77.50	0.40	31.20	7.8
8.	78.00	0.42	28.65	7.6
9.	78.00	0.44	23.21	7.3
10.	79.00	0.45	17.50	6.9

Table 3. Organoleptic Quality of Ber Cany (spiced) prepared from different ber varieties

Variety	Score	Organoleptic Quality and Rating
Gola	7.7	Like moderately
Umran	8.8	Like very much
Kaithli	7.4	Like moderately

The juice content in the Beverage was 33.3%. The RTS beverage processed from ber juice containing 33.3% juice, 3.7 PH total soluble solids (TSS). 19.6°Brix and 0.56 percent acidity. The beverage prepared from juice of both varieties were slight acid taste, a typical dried for flavour and redish brown colour. The juice of Umran had 15.6°Brix and 0.38% acidity where as juice of Kaithli variety had 12.5°Brix and 0.36% acidity. However the beverage prepared from juice of Umran variety was like moderately while juice of Kaithli variety was like slightly by the panel of ten judges (Table 1).

3.1 Varietal Screening

Organoleptic score of candy prepared from different ber cultivars is presented in Table 2. Umran cultivar recorded highest score followed by Gola and Kaithli. The Quality of product is highly related with quality of raw materials. Therefore screening of suitable cultivar(s) for production of quality products is highly important for processing Industry.

3.2 Storage Stability: For Spiced Ber Candy

Data on changes during storage revealed that the total soluble solids of candy increased after two months of storage (Table 2). An increase in total soluble solids may possible be due to the conversion of polysaccharides in to sugars. Generally during the storage, there will be loss of

moisture due to which the TSS shows an increasing trend. The increase in total soluble solids during storage has also been reported in ber candy. Acidity content increased slightly during storage of ber candy. Ascorbic acid content decreased continuously during storage in present study. Reduction in ascorbic acid could be due to oxidation by trapped oxygen in glass bottles which results in formation of dehydroxide ascorbic acid (Table 3). A Progressive increase in browning of candy was observed with storage period in present investigation. This is mainly due to non-enzymatic reaction such as organic acid with sugar or oxidation of phenol which leads to the formation of brom pigment. The present findings also support the contention that during storage of ber candy reduction in ascorbic acid content is responsible for an increase in browning. Organoleptic quality determines the storage stability of the product.

4. CONCLUSION

In present finding there was a gradual decrease in Organoleptic score of ber candy during storage at ambient temperature. Candy was acceptable up to nine months. There are many factors which determine the storage stability of the product. Hence, loss in Organoleptic quality and storage stability of the product after certain period is obvious. Temperature play an important role in inducing certain biochemical changes in the product.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Navitha D, Mishra S, Tarafdar M. Standardization of a recipe for the preparation of candy from ber. *The Pharma Innovation Journal*. 2018;7(8):445-447.
2. Shruthi S, Bahadur V. Standardization of sugar levels on Physico-chemical properties of peel candy of Karna Khatta (*Citrus karna*) during storage. *Journal of Pharmacognosy and Phytochemistry*. 2020;9(5):3030-4.
3. Humia BV, Santos KS, Schneider JK, Leal IL, de Abreu Barreto G, Batista T, Machado BA, Druzian JI, Krause LC, da Costa Mendonça M, Padilha FF. Physicochemical and sensory profile of Beaugard sweet potato beer. *Food Chemistry*. 2020;312:126087.
4. Craine EB, Bramwell S, Ross CF, Fisk S, Murphy KM. Strategic malting barley improvement for craft brewers through consumer sensory evaluation of malt and beer. *Journal of food science*. 2021;86(8):3628-44.
5. Maruza IM, Musemwa L, Mapurazi S, Matsika P, Munyati VT, Ndhleve S. Future prospects of *Ziziphus mauritiana* in alleviating household food insecurity and illnesses in arid and semi-arid areas: A review. *World Development Perspectives*. 2017;5:1-6.
6. Dobhal A, Awasthi P. Formulation of beetroot candy using simple processing techniques and quality evaluation. *Journal of Pharmacognosy and Phytochemistry*. 2019;8(4):913-6.
7. Humia BV, Santos KS, Schneider JK, Leal IL, de Abreu Barreto G, Batista T, Machado BA, Druzian JI, Krause LC, da Costa Mendonça M, Padilha FF. Physicochemical and sensory profile of Beaugard sweet potato beer. *Food Chemistry*. 2020 May 15;312:126087.
8. Durrani AM, Srivastava PK, Verma S. Development and quality evaluation of honey based carrot candy. *Journal of food science and technology*. 2011 Aug;48:502-5.
9. Mahato A, Chakraborty I, Baidya BK. Preparation and evaluation of fruit candy from unripe mango. *Int. J. Chem. Stud*. 2020;8(1):2727-31.
10. Babajide JM, Oyebanjo AA, Oyewole OB. Effect of storage on microbial and sensory qualities of packaged yam-cassava "poundo" flour. *Journal of Natural Sciences Engineering and Technology*. 2010;9(1):69-78.

© 2023 Marimuthu et al.; This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Peer-review history:

The peer review history for this paper can be accessed here:
<https://www.sdiarticle5.com/review-history/101128>