



Production of Nungu Candy: An Experimental Study

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Authors' contributions

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

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ABSTRACT

The palmyrah fruit is a naturally occurring, nutritionally dense fruit that has the potential to be a source of many goods with added value. Due to a lack of mechanisation and value addition, the juice of palmyrah is only available during certain seasons and is quite inexpensive. Palmyrah pulp is collected from the ripe fruit and is utilised in many traditional cuisine dishes. Fruit pulp aids in the treatment of skin inflammations. It is used to treat worm infestation as well as nausea and vomiting. It is employed as a liver tonic as well as an expectorant. The high amount of crude flavonoids, saponins, and phenolic chemicals may be responsible for the antioxidant action. Additionally, it is employed in folk medicine to treat a variety of illnesses. Due to the fruit pulp's significant therapeutic capabilities, it included both pectin and a sizable amount of saponin. Although seasonal, palmyrah fruits offer outstanding chemical and physical qualities for the creation of foods and drinks. There is a need for palmyrah that is prepared for serving.

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1. INTRODUCTION

Many tropical fruit tree species have their origins in India, albeit the majority are not commercially grown [1]. Despite this, they are an important source of livelihood support for many rural populations. This fruit diversity is significant not just for its nutritional worth but also as a source of revenue for households. It also has cultural and social significance and helps to maintain ecological stability (source). Numerous tropical fruits fall under the category of "underutilised species," which are defined as being i) locally abundant but restricted in their geographic dispersion and having a high use value, ii) little is known about them scientifically, and iii) their current use is constrained in comparison to their economic potential. Nungu is a soft jelly like endosperm obtained from the tender fruits of palmyrah palm (*Borassas flabellifer* L) [2,3]. The nutritive value of nungu is given below:

Moisture	-	92.5g
Protein	-	0.6g
Fat	-	0.1 g
Minerals	-	0.2 g
Fibre	-	0.2 g
Carbohydrates	-	6.4 g
Energy	-	28.9 Kcals
Calcium	-	12.0 mg
Phosphorous	-	21.0 mg
Iron	-	0.3 mg
Vitamin C	-	61.0 mg

This delicious product of the Palmyrah Palm is highly perishable and seasonal. It deteriorates in quality and spoils within a few days, even under the best storage condition. However the tender palmyrah fruit or nungu can be processed and preserved as nungu candy.

Nungu candy:

Ingredients

Nungu – 1 Kg
 Sugar – 1 Kg
 Citric acid - 5 g
 2% lime solution

2. MATERIALS AND METHODS

The tender nungu pieces are to be selected and the skin removed. The nungu is cut in two halves and pricked with a fork and steeped in 2% lime

solution for thirty minutes. The nungu pieces are then washed thoroughly, free of lime. The pieces are then soaked in a dilute sugar syrup of 40% TSS for one day. The next day, the nungu pieces are removed from the syrup, and the concentration of the syrup is increased to 60° Brix, by boiling. The syrup is cooled and the nungu pieces are again soaked in the syrup for 24 hours. The process is repeated and the strength of the syrup is increased by 5% on alternate days from 60% TSS to 75%. The nungu pieces are then soaked in a syrup of 75% TSS for a week. The nungu is then drained free of syrup and is dipped in boiling water to remove the adhering syrup and is shade dried and packed in polybags and stored.

3. RESULTS AND DISCUSSION

The designed beverage had a pH of 4.0, 12.5% sugar, and 12% fruit pulp. Fruit pulp was homogenised (30000 rpm for 5 min.) after pectin concentration was adjusted to 0.66%. The product was much more nutrient-dense than the original product, according to chemical and nutritional analyses. It contains 11.97% total sugar, 0.14% crude protein, 0.78% crude fat, 0.41% crude fibre, and 0.17% ash. The produced product has a total antioxidant capacity of 4044.00 ascorbic acid equivalent (AAE) mg/L, 137.57 gallic acid equivalent (GAE) mg/L, and 12.43% suppression of DPPH radical scavenging activity. Over the course of ten weeks, the created product did not exhibit any growth in yeast, mould, or bacterial count. Therefore, the prepared palmyrah fruit drink shown higher quality in the scrutinised prop. In 2019, Minh et al. [4] examined the viability of spray drying palmyrah palm juice. Spray-drying conditions, such as input flow rate, outlet air temperature, and drying carrier agent, have a significant impact on a number of properties of spray-dried fruit juice powders. "The spray drying of dried palmyrah palm powder from its juice was found to need the following parameters: inlet/outlet spray drying temperature (140°C: 85°C), speed flow rate (12 ml/min), arabic: maltodextrin (5: 5% w/v), and flow rate. On the basis of the results of phytochemical determination, physical and chemical characteristics, and antioxidant activity, it was determined that the spray-dried product of Arabic gum-maltodextrin-palmyra palm juice was a good approach to dry palmyrah palm juice. By altering the physical characteristics of the agricultural product, the value addition of

palmyrah palm juice has been generated, increasing its acceptability, availability, market viability, and cost to benefit ratio for the producer of palmyrah palm produce” [5].

4. CONCLUSION

One of India's most nutrient-dense fruits, palmyrah fruit seems to be wild and has long been recognised for its healing and medicinal capabilities [6]. Unlike other fragile fruit trees, the palmyrah palm is quite resilient and can flourish in challenging agroclimatic conditions. The ripe palmyrah fruits have not been used or preserved in any way. The writers have only created a few methods for extracting the pulp from palmyrah fruit. The yield of pulp, which has the consistency of mango pulp, increases by roughly 122 percent when the same quantity of water is added. Because the total solid content of the palmyrah fruit is roughly double that of other common fruits, no other fruit will provide such a large output of pulp ready for processing. According to the research, pulp from palmyrah fruit may be used to create a number of approved items [7]. To allow the commercial utilisation of this fruit, such preparations must be standardised, and storage specifications are also developed [8]. The flavour of the palmyrah fruit is also completely unknown in the export market, and a wide variety of produced goods have fully preserved the original flavour. The possibility of popularising the growing of undomesticated fruit specifically for the processing business is also highlighted by current studies.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Dawson IK, Leakey R, Clement CR, Weber JC, Cornelius JP, Roshetko JM,

Jamnadass R. The management of tree genetic resources and the livelihoods of rural communities in the tropics: Non-timber forest products, smallholder agroforestry practices and tree commodity crops. *Forest Ecology and Management*. 2014;333:9-21.

2. Vengaiah PC, Murthy GN, Sattiraju M, Maheswarappa HP. Value added food products from palmyra palm (*Borassus flabellifer* L.). *Journal of Nutrition and Health Science*. 2017;4(1):1-3.

3. Immanuel RR, Rao GB. Production potential of groundnut under palmyra (*Borassus flabellifer*) based agroforestry system in coastal red soils of Tamil Nadu. *Crop Research*. 2021;56(3and4):105-10.

4. Minh NP, Nhi TTY, Nguyen TN, Bich SN, Truc DTT. Some factors influencing the properties of dried watermelon powder during spray drying. *Journal of Pharmaceutical Sciences and Research*. 2019;11(4):1416-1421.

5. Vengaiah PC, Kaleemullah S, Madhava M, Mani A, Sreekanth B. Palmyrah fruit (*Borassus flabellifer* L.): Source of immunity and healthy food: A review. *The Pharma Innovation*. 2021;10(11):1920-5.

6. Weerasekara PC, Withanachchi CR, Ginigaddara GAS, Ploeger A. Nutrition transition and traditional food cultural changes in Sri Lanka during colonization and post-colonization. *Foods*. 2018;7(7): 111.

7. Subharaj C, Logesh K, Gnanaraj SJP, Appadurai M, Vimalan PMAS. Design and development of Palmyra fruit pulp production equipment through sustainable approach. *Materials Today: Proceedings*. 2022;68:1762-1768.

8. Liu Y, Chen S, Pu Y, Muhammad AI, Hang M, Liu D, Ye T. Ultrasound-assisted thawing of mango pulp: Effect on thawing rate, sensory, and nutritional properties. *Food Chemistry*. 2019;286: 576-583.

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