



**PG & RESEARCH DEPARTMENT OF ZOOLOGY
DEPARTMENT OF MICROBIOLOGY
MUSLIM ARTS COLLEGE**

[Affiliated to Manonmaniam Sundaranar University]
Thiruvithancode - 629 174, K.K. Dist, Tamilnadu, India.

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CERTIFICATE

This is to certify that Prof./Dr./Mr./Mrs./Ms J. VIJILA, JASMIN, Asst. Professor & Dr. Dept. of Zoology, Muslim Arts College, Thiruvithanoodas participated / presented a research paper entitled *St. study on the sensory characteristics of A. rengea pinnata* based..... products..... in the National

Seminar on "Climate change and Biodiversity" organized by the PG & Research Department of Zoology & Department of Microbiology, Muslim Arts College, Thiruvithancode - 629 174, held on 27th September 2023.

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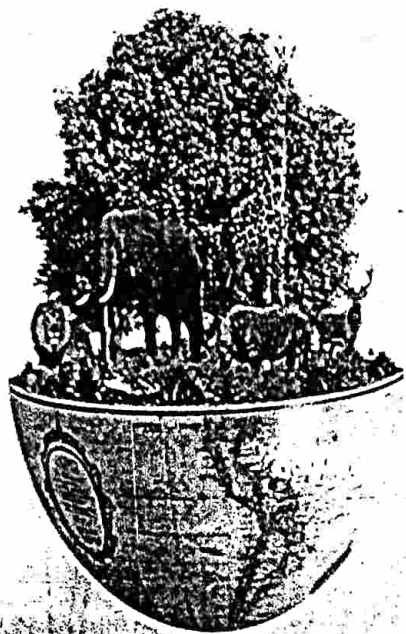
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MUSLIM ARTS COLLEGE

(Affiliated to M.S.University, Tirunelveli)

Thiruvithancode-629174

Kanyakumari district



RAJ Pathippakam,
3E, North Street
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Nagercoil-4

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A STUDY ON THE SENSORY CHARACTERISTICS OF *ARENGA PINNATA* BASED PRODUCTS

T.Sherin Mary^{1,2,3} and J.Vijila Jasmin^{2,3}

1. Research Scholar, Reg.No:19223092272019

2. PG & Research Department of Zoology, Muslim Arts College, Thiruvithancode, Kanyakumari District- 629174, Tamil Nadu, India

3. Manonmaniam Sundaranar University, Tirunelveli, 627012, Tamil Nadu, India

ABSTRACT

Palm candy is a natural sweetener made from sap/nectar collected from the flowers of several species of palm tree. This sugar has been used as a traditional and an alternative sweetener in the South-East and South Asian regions. This sugar is widely used as sweetener for beverages and foods. It does not only provide the sweetness to the products, but also develop their colour, aroma, and taste. In the present study *Arenga pinnata* based products such as payasam, kesari and gulab jamun were prepared using palm candy and compared with the products prepared with white sugar. Sensory evaluations of the formulated products were also evaluated using a score card.

Keywords: Palmyra palm, Natural sweetner, Colour, Aroma, Taste.

INTRODUCTION

Borassus flabellifer Linn. (*palmyra palm*), belonging to the Arecaceae family, grows wild from the Persian Gulf to the Cambodian-Vietnamese border, and is commonly cultivated in India, Southeast Asia, and Malaysia, and occasionally in other warm regions, including Hawaii and Southern Florida. Palms are tree crops which benefit the environment ecologically, as they restore damaged soil, requiring very little water in the process. In addition to the sweet sap from the inflorescence and the many products of the leaves, trunk, and underground seedlings, a thin orange pulp coating the fibers of the mature fruit is consumed fresh or dried as a paste. The large seeds, when immature, before the shell hardens, contain jelly-like kernels esteemed for food. (J Mogeia *et al.*, 1991).

In India, a wide diversity of palmyrah palm is observed in States of Tamil Nadu, Kerala, Karnataka, Andhra Pradesh, Orissa, West Bengal and Assam (Davis T.A *et al.*, 1987).

Palmyrah palm jaggery is the jaggery obtained by boiling palm sap or neera. It has an intense earth taste and is slightly salty. Other names for it include sugar palm and toddy palm. It is a simple tropical palm tree to grow and can be seen thriving in the wild. Jaggery made from the sap of this tree has several health benefits and medicinal applications. It is chemical free and has a cooling effect on the body. It is highly-priced for these reasons (Vengaiah *et al.*, 2017).

Palm sugars have been used as a traditional sweetener for thousands of years in Asia. It is now gaining popularity globally because of its natural source, minimal processing, and healthiness. One of the major health claims is glycaemic index (GI). Palm sugars are normally marketed as low GI foods, though only a few published papers are evidenced (K Srikaeo *et al.*, 2015).

It shows that palm sugar (gula anau) exhibits the highest level of antioxidant activity compared to various types of cane sugars, having an antioxidant activity equivalent to 1.7 mg of vitamin C per 1 g of sugar (J Sia *et al.*, 2010).

It has been reported that palm sugars contain considerably high amounts of polyphenols and flavonoids (S kongkaew *et al.*, 2014).

Palm sugars were reported to contain significant amount of dietary fiber, especially inulin (Trinidad *et al.*, 2010; Vayalil, 2012).

There are many health benefits of palm jaggery. It improves digestion, boosts the production of digestive enzymes, and facilitates bowel movement. It also boosts immunity and is rich in zinc and potassium, which help the body fight against several diseases. It also helps prevent anemia. Palm jaggery is a good source of iron that allows the body to maintain hemoglobin levels. On the other hand, Palm candy or "Tal mischief" is a commonly prepared confectionary product made from a combination of palm jaggery, water, and various other forms of sugars, cane sugar being the most widely used one (Borse *et al.*, 2007; Lasekan & Abbas, 2010).

It is a crystalline translucent sweet candy. As a product, it has significant economic importance and is consumed extensively in many states of India. Like palm jaggery, palm candies are a good source of ascorbic acid, nicotinic acid, riboflavin, and several minerals. It also has a reasonably high percentage of carbohydrates and protein. Palm candy is produced by boiling a mixture of store-bought neera in a galvanized iron pan until it reaches its striking point. It is crystalline, sweet, and translucent. Palm candy confers several health benefits upon its regular consumption. It is said to aid in treating chickenpox, digestive problems, coughs, and colds. Palm candy is also thought to be advantageous throughout pregnancy (Devdas *et al.*, 1969).

Palm candy is either used widely for the preparation of sweet foods or directly consumed as food (Sahu and Paul *et al.*, 1998).

Palm candy possesses some health benefits like useful in urine trouble, digestion, cough and cold and chicken pox and is beneficial during pregnancy (Lata & Kamala 1966; Devdas *et al.* 1969; Uzochukwu 1997).

They can also help cleanse the system by flushing out any unwanted entities. Furthermore, it also stimulates bowel movement upon consumption. Helps relieve several Common Ailments- Palm jaggery has been historically utilized for its medicinal properties. It was used to treat dry cough and cold during ancient times. Palm jaggery helps dissolve the mucus present in the respiratory tract thus clearing it. Natural medicinal entities and minerals present in palm jaggery help to reduce this pain associated with the onset of migraines. Palm jaggery which is rich in minerals like potassium helps with weight loss (Huynh Thi Le *et al.*, 2020).

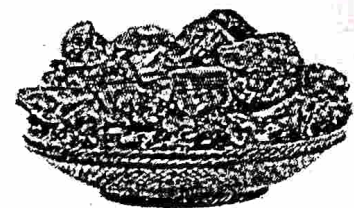
The high potassium levels associated with this raw sweetener help reduce water retention and bloating. Hence, it can very well be used as a supplement in one's weight loss regime. It has a plethora of antioxidants and micronutrients like iron, manganese, magnesium, etc. It is also adept at strengthening the bone marrow in young children, in a few weeks. It also helps boost their immunity and health as well. Upon regular consumption palm jaggery has a cooling effect on the body owing to its alkaline nature. (Gallen *et al.*, 1998)

OBJECTIVES:

- To formulate products using palm candy.
- To find the sensory qualities of the palm candy products.

MATERIALS AND METHODS:

Collection of Sample:



The sample used for the study is palymra palm candy. The samples are collected from a grocery shop, Nagercoil.

Formulation of the Product:

Payasam:

INGREDIENTS	Payasam	Arenga pinnata Payasam
Ghee	1 tsp	1 tsp
Cashew nut	25 gms	25 gms
Raisins	25 gms	25 gms
Vermicelli	100 gms	100 gms
Milk	500 ml	500 ml
Sugar	350gms	-
Palm candy	-	350 gms

METHOD:

In a heavy pan or kadai, add 2 tablespoons ghee first. Let it melt. Once it melts, and then add 12 to 15 cashews. On a low heat fry the cashews in ghee until they become golden. Remove the golden fried cashews with a slotted spoon and then add 1 tablespoon raisins to the hot ghee. Once the raisins swell, and then remove them with a slotted spoon. In the same kadai add 1 cup broken vermicelli. Roast until the vermicelli becomes golden, and then add milk. When the vermicelli become softened add sugar or palm candy according to the sweetness desired. Sprinkle $\frac{1}{2}$ teaspoon cardamom powder. Switch off the heat and then add the fried cashews and raisins.

KESARI:

INGREDIENTS	Kesari	Arenga pinnata Kesari
Ghee	25 gms	25 gms
Cashew nut	15 gms	15 gms
Semolina	160 gms	160 gms
Milk	500 ml	500 ml
Cardamom	$\frac{1}{2}$ tsp	$\frac{1}{2}$ tsp
Sugar	200 gms	-
Palm candy	-	200 s

METHOD:

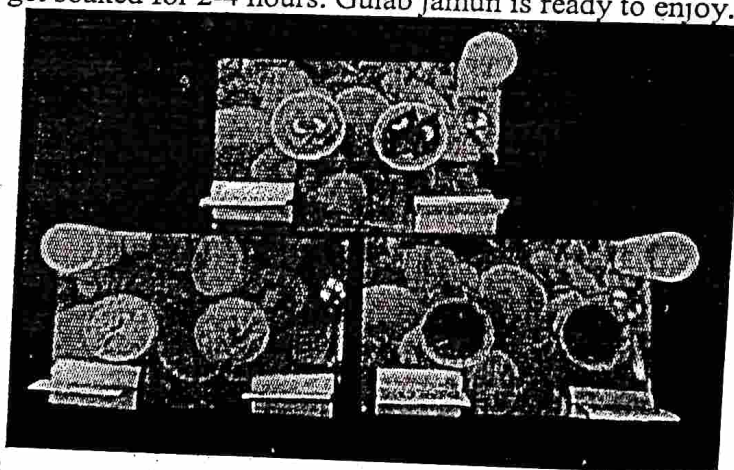
In a thick bottomed frying pan, take 6 tablespoons ghee. Heat ghee in medium-low heat till it melts completely. Add 3 to 4 tablespoons cashews and fry till golden. Add 1 cup (160 grams) fine rava to the ghee. Roast the rava on low to medium-low heat. Stir often so that rava roasts evenly. The color of the rava should not become brown. Roast till you can see the ghee getting separated and the color of rava will also change. When you begin to roast rava, take ¼ cup (190 to 200 grams) palm candy or sugar in a saucepan. The palm candy syrup needs to be cooked simultaneously while roasting rava. Add 2.5 cups water and begin to heat the palm candy solution. Bring this sugar syrup to a rolling boil. By the palm candy syrup starts boiling; the rava will also get roasted well. Cook the mixture on low to medium heat, stirring often. When the mixture starts thickening, add the fried cashews and raisins, add ½ teaspoon green cardamom powder. Stir till the mixture releases some ghee and the rava has absorbed all the water and cooked well. Remove the lid and give a stir and serve hot.

GULAB JAMUN:

INGREDIENTS	Gulab Jamun	Arenga pinnata Gulab Jamun
Gulab jamun mix	125 gms	125 gms
Milk	25 ml	25 ml
Water	As required	As required
Palm candy	100 gms	-
Sugar	-	100 gms
Cardomom powder	A pinch	A pinch

METHOD:

In a wide bowl, mix the gulab jamun mix with milk and make smooth dough. Add milk little by little. Add powdered and filtered (sieved) palm candy or sugar to it and cook in slow flame for 10 minutes. Switch off when an aroma arises and the below consistency is reached. In the meantime roll the dough into small balls. Deep fry them in oil. Add to palm candy syrup or sugar. Let it get soaked for 2-4 hours. Gulab jamun is ready to enjoy.



Formulated products

Sensory Evaluation of the Formulated Products

The prepared products were subjected to sensory analysis to find out the acceptability. The formulated products were organoleptically evaluated by using numerical score card. Sensory assessment were evaluated on the quality description i.e., appearance, texture, taste, colour, flavour and overall acceptability. The sensory evaluation was carried out for the products such as Payasam, kesari and gulab jamun. The products were evaluated by a panel of 20 semi

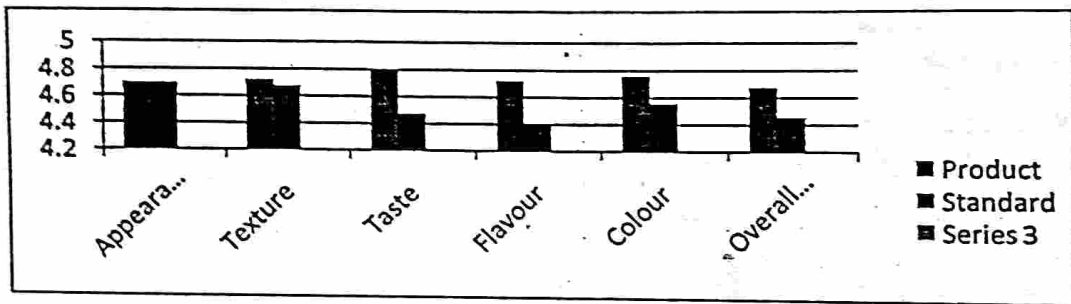
trained members from PG and Research Department of Nutrition and Dietetics, Muslim Arts College, Thiruvithancode, Kanyakumari District.



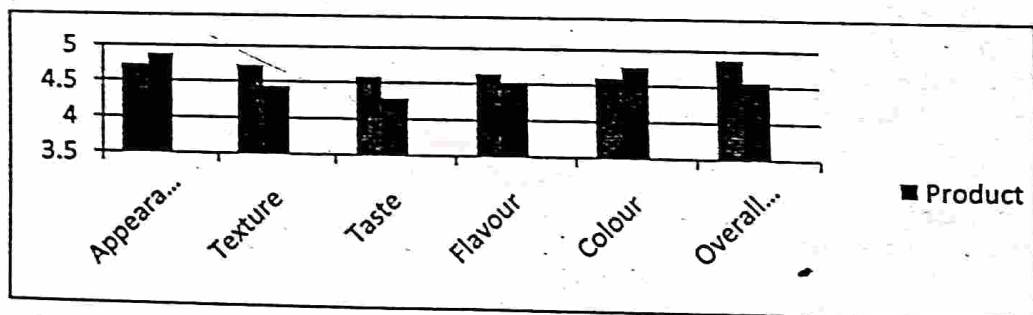
Sensory evaluation of the formulated products

RESULT AND DISCUSSION

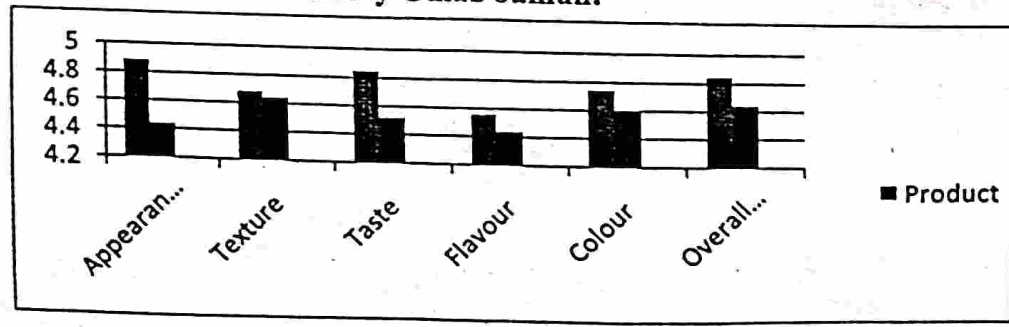
Sensory Parameters of Payasam:



Sensory Parameters of Kesari:



Sensory Parameters of Palm Candy Gulab Jamun:



CONCLUSION:

Palm Candy is a valuable nutritional product. It can be produced in various forms such as syrup and powder. It posses many biological functions with beneficial effects on human health. *Borassus flabellifer* is a medicinal plant with innumerable medicinal qualities for all parts used since ancient times. It is concluded that using palm candy we can formulate different types of products with acceptable taste and flavor.

BIBLIOGRAPHY

- Borse, B. B., Rao, L. J. M., Ramalakshmi, K., & Raghavan, B. (2007). Chemical composition of volatiles from coconut sap (neera) and effect of processing. *Food Chemistry*, 101, 877-880.
- Davis, T.A., and D.V. Johnson. 1987. Current utilization and further development of the palmyra palm (*Borassus flabellifer* L., *Arecaceae*) in Tamil Nadu State, India. *Economic Botany* 41(2): 247-266
- Devdas, R.P., Sundari, K. and Susheela, A. 1969. Effects of supplementation of two schools lunch programmes with 'neera' on the nutritional status of children. *J. Nutr. Diet.* 6, 29-36
- Gallen, I. W., Rosa, R. M., Esparaz, D. Y., Young, J. B., Robertson, G. L., Batlle, D., Epstein, F. H., & Landsberg, L. (1998). On the mechanism of the effects of potassium restriction on blood pressure and renal sodium retention. *American Journal of Kidney Diseases*, 31(1), 19-. 10.1053/ajkd.1998.v31.pm9428447.
- Huynh Thi Le, D., Lu, W.-C., & Li, P.-H. (2020). Sustainable processes and chemical characterization of natural food additives: Palmyra palm (*Borassus Flabellifer* Linn.) granulated sugar. *Sustainability*, 12(7), 2650. 10.3390/su12072650.
- J Sia, HB Yee, JH Santos and MKA Abdurrahman. Cyclic voltammetric analysis of antioxidant activity in cane sugars and palm sugars from Southeast Asia. *Food Chem.* 2010; 118, 840-6.
- K Srikaeo and R Thongta. Effects of sugarcane, palm sugar, coconut sugar and sorbitol on starch digestibility and physicochemical properties of wheat based foods. *Int. Food Res. J.* 2015; 22, 923-9.
- Lasekan, O. and Abbas, K.A. 2010. Flavour chemistry of palm toddy and palm juice: A review. *Trends Food Sci. Technol.* 21, 494-501
- Lata, M., & Kamala, S. (1966). Palm gur in nutrition. *Journal of Nutrition & Dietetics*, 3,18
- Moge, J., Seibert, B. and Smits, W. 1991. Multipurpose palms: the sugar palm (*Arenga pinnata* (Wurmb) Merr.). *Agroforestry Systems* 13: 111-129.
- S Kongkaew, M Chaijan and S Riebroy. Some characteristics and antioxidant activity of commercial sugars produced in Thailand. *KMITL Sci. Tech. J.* 2014; 14, 1-9.
- Sahu, A.P. and Paul, B.N. 1998. The role of dietary whole sugar-jaggery in prevention of respiratory toxicity of air toxics and in lung cancer. *Toxicol. Lett.* 95, 154
- Trinidad, T. P., Mallillin, A. C., Sagum, R. S. and Encabo, R. R. 2010. Glycemic index of commonly consumed carbohydrate foods in the Philippines. *Journal of Functional Foods* 2: 271-274. Vayalil, P. K. 2012. Date fruits (*Phoenix dactylifera* Linn): An emerging medicinal food. *Critical Reviews in Food Science and Nutrition* 52: 249-271
- Uzochukwu, S. V. A., Balogh, E., Tucknott, O. G., Lewis, M. J., & Ngoddy, P. O. (1997)
- Vengaiah, P. C., Murthy, G. N., Sattiraju, M., & Maheswarappa, H. P. (2017). Value added food products from Palmyrah palm (*Borassus Flabellifer* L). *Journal of Nutrition and Health Sciences*, 4. 10.15744/2393 9060.4.105.