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NEED PROTECTION AND SPECIAL ATTENTION FOR PALMYRA PALM PRODUCTS

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Abstract: Palmyra tree is a multi-purpose tree. There are varieties of products produced from palm tree. These are producing from palm trees various parts they are wood based, leaf based fiber based, coir based, etc. The aim of this study is to protect the Palmyra tree and make awareness about Palmyra palm products. The edible and non-edible products of Palmyra palm were analyzed. The edible products are good for health and providing various medicinal and nutritional benefits to the humans. The non-edible products are useful to humans like mat, bags, manuscripts, fiber brushes, baskets, etc. These products are easily available in village area, but these are very important for human life growth. The central and state Government supports are needed for to grow these products. Proper training and awareness program among producers will increase the development of Palmyra palm products and manufacturing industries. The palm board needs to take necessary step to protect Palmyra trees.

Keywords: Palmyra palm, toddy, sprouts, fiber, manuscript.

INTRODUCTION

Agriculture plays a vital role in the Indian economy. In agriculture the coconut palm, Date palm, and Palmyra palms are plays an important role in growth of Indian economy and earning foreign money. India is the third largest coconut producing country in the world. Tamilnadu, Karnataka, Andhra and Kerala are the leading coconut producing states in India. And the well known date palm is one of the sweet edible fruit. It is widely cultivated palm

tree and it has providing various nutritional and medicinal benefits to human. Both coconut and date palms are widely used for various purposes like handmade basket, fiber robes, fiber brushes, fans, hats, and mats etc.,

The Coconuts have separate board for farmer's welfare (Coconut Development Board) and this board control by ministry of agriculture under government of India. The Palmyra palm is also same kind of coconut tree it has been providing more products like neera sap ,palm jaggery, palm sugar, palm candy, nungu, palm fruit jam , palm wine palm sprout etc;. Its woods are used for making various handmade products, wood based products, leave based products, coir based products etc, and Palmyra palm has various medicinal benefits. It has very good home and export market and also earning foreign money. But the both state and central government are not given sufficient important for its growth like coconut products. Srilanka has been giving special attention for growth of palm products.

AREAS OF PALMYRA CULTIVATION

Native to tropical regions of Africa, Asia and New Guinea.Palmyra palms are economically useful and widely cultivated, especially in South–East Asia. The Palmyra palm tree has long been one of the most important trees of Cambodia and India. It is native to South and South-east Asia, in the Indo-Malaya eco-zone. It is a palm tree of the sugar palm group. It is found from Indonesia to Pakistan,India, Jawa, Laos, Lesser Sunda Island, Malaya,Myanmar, Socotra, parts of China, Sri Lanka , Sulawesi,Thailand, Vietnam, Philippines, South and South-East Asia. It is determining the natural distribution of *Borassus flabellifer*. It is a widely planted crop plant and largely restricted to areas with seasonal rainfall and ranges from Western India through Indochina to the Lesser Sunda Islands of Indonesia. *Borassus flabellifer* was also found in Queensland, Australia .

PALMYRA PALM TREE



Source:<https://www.shutterstock.com>

The word Palmyra is also known as “**Borassus flabellifer**” the name borassus was derived from a Greek word. The meaning of borassus means leathery covering of the fruit, and the word flabellifer means Fan bearer. Borassus flabellifer is a robust tree. It can live more than 100 years and reach the height of 50 to 60 meters. In severe climatic situation it's very tough to withstand for palmyra tree. These can be grown in waste lands, farm filed boundaries, sea costs, parks, industrial estates and house colonies. The palmyra palm throws out spathes during the flowering season. The trunk is grey, robust and old leaves remain attached to the trunk for several years before falling cleanly. The leaves are look like fan-shaped and it grow up to 3 meters long, with robust black teeth on the petiole margins. It is clear, almost transparent, sweet, pleasant smelling and refreshing and popular drink on account of its highly nutritive value, delicious taste and agreeable flavor. The different part of the plant such as root, leaves, seeds, and fruit are used for various purposes. Nowadays palm trees are being cut by people because of not knowing the medical and commercial values. Proper steps have to be taken to stop cutting palms through awareness among people.

The Palmyra palm products are being exported all over the countries like USA, UK, Canada, Malaysia, omen, Australia, Germany, Poland, Spain, Japan, etc. The products Palmyra palms are increasing the country's economy growth. The annual growth rate of Palmyra is 5.1%. The Palmyra tree contains various nutritional and medicinal benefits. It includes both edible and non-edible products. India has around 102 million palm trees, out of 102 million palms half of them are in Tamilnadu. Tamilnadu has 51.9 million palm trees, in that thoothukudi district alone has 10 million palms. It provides various employment opportunities in rural area peoples and also provides more income to poor peoples. The Palmyra tree is one of the India's most important trees.

PALMYRA PALM PRODUCTS:

The peoples are producing various products from Palmyra trees. They are divided into two types like edible and non edible products. Those are detailed below:

(i) Edible products.

Edible products are Neera sap, Palm jaggery, Palm sugar, Palm candy, Nungu, Palm fruit jam, Palm chocolate, Palm rock candy, Palm sprouts, Palm wine, Palm pickle, Palm halvah, etc.

(ii) Non-edible product

The non-edible products are produced from Palm leaf, Palm fiber and brush varieties, Palm made basket and other handmade products, Palmyra houses, and Palmyra coir fiber ropes, etc.

USES OF EDIBLE PRODUCTS

Neera Sap

Neera, also called as palm nectar. It is a sap extracted from the inflorescence of various species of toddy palms and used as a drink. Neera extraction is generally performed before sunrise. It is sweet, translucent in color. It is susceptible to natural fermentation at ambient temperature within a few hours of extraction. Once fermented, neera becomes toddy. Unfermented sap is called “Neera” (padaneer in Tamilnadu) Neera is said to contain many nutrients including potash, palm sap begins fermenting immediately after collection due to natural yeasts in the air. Another name for neera sap is toddy sap. It involves tapping and collecting dripping juice in hanging earthen pots. The juice collected before morning is light drink called as Neera. The toddy sap of the palm flower undergoes natural fermentation due to yeast which is present in the sap itself. Fermentation starts soon after the sap is collected and within two hours it become reasonably high in alcohol yet less than 4% which is similar to beer. It has very short life of 24 hours. Toddy is fermented to make jaggery. The medicinal benefit of toddy sap is it has rich vitamin C and toddy sap has more food calories than milk. It helps to fight against the diabetes. The sap is help to cure cancer. And it helps to prevent hair fall.

Toddy Tapper collecting sap and Pure and fresh Palmyra sap



Source: Santha Kumar reddy .O (2014) Sustainable project on Toddy palm value chain

Palm wine

Palm wine is an alcoholic beverage created from the sap of various species of palm tree such as the Palmyra, date palms, and coconut palms. Palm wine can be obtained from the young inflorescence either male (or) female ones palm wine is alcoholic beverage that are made by fermenting the sugary sap from various palm plants. It is collected by tapping the top of the trunk by felling the palm tree and bo a hole into the trunk it is a cloudy whitish beverage with sweet alcoholic taste and very short shelf life of only one day, the wine is consumed in a variety of flavors varying foam sweet unfermented to sour ,fermented and vinegary, there are producing many various of the products and no individuals method or recipe palm wine is particularly common in parts of Africa, South India , Myanmar and Mexico. These products are have some

local like emu and ogogoro in Nigeria and Nsafufuo in Ghana, kallu in south India and tuba in Mexico. Palm sap naturally has yeast because of that it begins fermenting immediately within two hours. It has more health benefits. it has the ability to increase eye sight and fight against the cancer. It helps to maintaining healthier hair, nail and skin. It reduces the risk of cardiovascular disease.

The collected palm wine by tapper



Source:https://en.m.wikipedia.org/wiki/Palm_wine

Palm Jaggery

Jaggery means the product obtained by boiling or processing juice extracted from Palmyra palm. The yield of palm jaggery obviously depends on sugar content of the juice and the efficiency of extraction process. Liquid jaggery is an intermediate product obtained during jaggery making. It is one of the important sweetening agents known from ancient times. The unfermented juice is filtered and then boiled till it bubbles in iron vats. Once it's cooled, it is poured into moulds most farms use coconut shells for the moulds. Once it is set in these moulds, the karupatti or Jaggery is ready for consumption.

It is collected in semi-liquid form, from the boiling juice at a particular temperature and could be preserved for a year or more. Price of palm jaggery is determined by quality, especially the flavour. Since the availability of palm jaggery is seasonal and demand is usually more than its production. Its price is comparatively much higher than sugarcane sugar. India produces about 6 Mt of jaggery annually, which accounts for 70 per cent of the total production in the world, 65-70 per cent of the total jaggery is from sugarcane and the remaining 30 per cent is from palms.

Process of palm Jaggery



Source: Ashwin Rajagopalan (2018) Palm jaggery tamilnadu alternative to sugar.

India is world's largest producer of sugar and sugarcane. Sugarcane in India is processed in to sugar, gur and khandsari and undergoes considerable weight reduction during processing. The methods of converting sugarcane and manufacturing sugar, gur and khandsari are different but a great value is added in the manufacturing of these consumable final products. Further it offers employment opportunity to millions of people. Gur is prepared in all parts of the country. It is also known as Gul, gud, Jaggery. It is called in local language Vellum and Bella.

Importance of jaggery

Jaggery is far complex than sugar, as it is made up of longer chains of sucrose. Hence, it is digested slower than sugar and releases energy slowly and not spontaneously. This provides energy for a longer time and is not harmful for the body. But this does not certify it fit for consumption by diabetics, because ultimately it is sugar. Jaggery also gathers a considerable amount of ferrous salts (iron) during its preparation, and it is prepared in iron vessels. This iron is also good for health, particularly for those who are anaemic or lack iron. Again, jaggery also contains of traces of mineral salts which are very beneficial for the body.

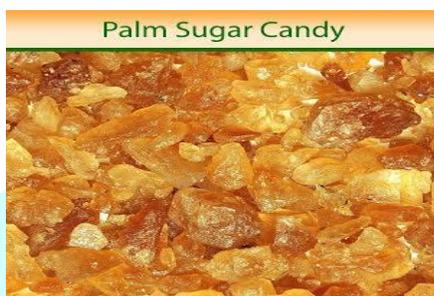
A usage of Gur is also seen in leather and tobacco industries. Besides, in cement industries and coalmines, Gur is supplied to the workers for in order to protect them from dust allergies. And at the time of natural calamities, the district administration purchases Gur and distributes it to the victims for various health benefits. Palm jaggery has number of minerals and vitamins. It is healthy and natural sweetener. It has an important position in the olden days of ayurveda. It helps to our skin glow. Palm jaggery improves digestion. It has rich iron and increase hemoglobin. It helps to boost our immune system. Palm jaggery is rich in calcium which makes healthier and stronger bone. It helps to heals migrains. Palm jaggery helps to weight loss and cure cough and cold^[12].

Palm candy

The medicinal and nutritional benefits of palm candy were mentioned in Siddha and ayurveda books. Palm candy has been used in our country since ancient times. But in tamilnadu in every village they are using palm candy in their day today life. Tamilnadu is a commercial leader in making palm candy. In the thirunelveli district, udankudi, kottangkaadu, sirunadar, sathankulam, adaikalapuram palm candy product produced in such villages have great commercial significance. Palm candy is made from neera sap of Palmyra.

Uses of palm candy:

- It is completely natural. It is a nutrient rich product. It has more vitamins, minerals, iron and calcium. It relieves urinary problem and helps to treat anemia
- . Palm candy increases metabolism and cure ear pain, sore throat by drinking hot milk with pepper and turmeric powder. It helps to cure cough and very healthy product for children's. It helps to reduce the body heat.
- Chew on a couple of palm sugar crystals with a small piece of dry ginger. It soothes a sore throat in next to no time.
- When children mix milk with palm candy the heat is reduced.
- Palm candy is often given to patients suffering from smallpox and heat.



Source: <https://mangalorespice.com>

Palm sugar

They bring down palm sugar from four varieties of trees such as Palmyra tree, lure tree, Sago palm tree and Coconut tree. Palm sugar is a sweetener that is made from the sap present in the flower buds of the palm tree.

Palm sugar nutrients from variety of trees: (Source: Sampantham.K Palm industry book 1968)

Neera sap	Nutrients of sugar
Coconut tree	14.12%
Lure tree	12.93%
Palmyra tree	12.45%

It is known as natural sugar because it involves minimum processing and no chemicals are used. The sap from the tree is heated to wick away the moisture content until thick syrup is obtained, and this sweet nectar is then further reduced to crystals. In the stores, palm sugar is available in the block, granular and liquid form. Palm sugar helps to prevent heart disease and helps to avoid osteoporosis. The main nutrient found in palm sugar is mineral. A single

teaspoon of palm sugar provide one percent of potassium. It helps the digestive system to function properly. It helps to treat dry cough, cold and loss weight. Palm sugar helps to reducing bloats feelings and retention of water.

Palm sugar picture



Source: Plavaneeta Borah, NDTV (2017) Palm sugar is good for health

Nungu Or Palm fruit

Palm fruit has anti-inflammatory and antioxidant properties. The antioxidant activity could be attributed due to the presence of high content of crude flavonoids. The fruit pulp helps to cure skin inflammations. It is used to treat nausea and vomiting as well as worm infestation. It is used as an expectorant and also as a liver tonic. A thin layer of sugar palm fruit jelly applied on the affected area has a soothing effect and immediately alleviates the itchiness associated with prickly heat. Being rich in minerals and vitamins, sugar palm fruits are a healthy option for people on diet or suffering from diabetes. It is a rich source of vitamins such as B, C and rich in minerals such as iron, zinc, potassium, calcium, phosphorus, thiamine, and during summers use palm fruit, to keep body hydrated. It also replenishes the lost minerals and nutrients of the body and prevents painful urination and tiredness in the body. It is used effectively to treat digestive problems and other stomach ailments. It is also used as a laxative. Sugar palm fruit is a good option for those who are on a diet. It also prevents malnutrition in children and adults^[14].

The Nungu season generally runs from May through August. The fruit of this tree is borne in clusters and is about 4 to 7 inches in diameter with a black shell. Inside the black shell are three sweet jelly seed sockets covered by a thin, yellowish-brown skin. The fleshy white body contains watery fluid however; the fibrous and ripened outer layer of the palm can also be eaten raw, boiled or roasted. The fruit is like jelly.

Palm fruit:



Source: S.Artnarong and Maneesri Jaruwan (2016) Acetic acid bacteria from Palmyra palm fruit pulp

Palmyra sprouts

Palmyra sprout (also known as Palmyra tuber) is a sprout that grows on Palmyra palms or *Borassus flabellifer*. The germinated seed's hard shell is also cut open to take out the crunchy kernel, which tastes like a sweeter water chestnut. Palmyra sprouts are containing various health benefits. It is good in taste. Palmyra sprouts are available in particular season only. It helps to reduce the body heat and prevent constipation. It contains more fiber so, it reduces the weight. It prevent stomach problem and helps to improve immunity. Palmyra sprouts can strengthen the bones and good for uterus. It has great source of omega 3 so, it reduce the high cholesterol. Sprouts prevent heart disease, cancer and improve immune system.

Palmyra sprouts in bundle and boiled Palmyra sprouts:



Source: <https://wikivisually.com>

The Nutritional analysis of the roots has shown 8.54% protein content, 23.53% carbohydrates, 7.29% crude fibre and negligible fat content. These roots are found to be high in calories. The nutritional analysis of the roots has shown 8.54% protein content, 23.53% carbohydrates, 7.29% crude fibre and negligible fat content. These roots are found to be high in calories. The seedlings as well as the fleshy roots are eaten. These form an important item of food for the poor. About 100 to 150 drupes are sown in 3-4 layers per 0.8 sq m under loose and sandy soils, which may produce at least 100-150 seedlings, sometimes more.

They are removed when 2-4 months old and the elongated, club-shaped, starchy, tender material is eaten either baked, roasted, fried or boiled, or made into flour. To preserve the seedlings for future use, they are boiled and dried in the sun. The fleshy roots are eaten when about four months old. They are rich in starch, but poor in fats and proteins. The root is considered cooling, restorative, diuretic and anthelmintic. It is applied as a cure for gonorrhoea.

The decoction of the young root and expressed juice from the young terminal buds and leaf-stalks has been used in gastritis and hiccups. It is useful as an antacid in heart-burn and as an anti-periodic^[11].

Table 1: Nutritional composition of roots of *Borassus flabellifer*.

Composition	Content
Moisture (g 100 g ⁻¹ FW)	62.38
Ash (g 100 g ⁻¹ DM)	4.95
Protein (g 100 g ⁻¹ DM)	8.54
Fat (g 100 g ⁻¹ DM): (Fresh, dried)	0.6
Crude fiber (g 100 g ⁻¹ DM)	7.29
Carbohydrates (g 100 g ⁻¹ DM)	23.53

Mineral elements in *B. flabellifer* roots (ppm)

Composition	Content
Strontium	0.14
Copper	0.09
Zinc	0.08
Aluminum	0.48
Iron	1.38
Manganese	0.11
Arsenic metal	0.22
Lead metal	0.14

Source: Screening of Nutritional, Phytochemical, Antioxidant and Antibacterial activity of the roots of *Borassus flabellifer* Chayanika Sahni, (2014).

NON –EDIBLE PRODUCTS:

Palmyra leaf



Source: <https://www.shutterstock.com>

The pliable, tender Palmyra leaf has good structural strength. So it is used to make decorative Olai (leaf) baskets. Palm tree grow in high temperature areas. They grow up to 100 feet height crowned by large fan-shaped leaves that radiate from its tip. Each tree has approximately twenty-eight fronds of fully opened leaves. They are leathery, brittle and greenish brown in color. But the best material for making Palmyra baskets is the Kuruttu, the tender new leaf. It is slightly concave in section and has a rough skin on both sides. The skin of the inner section known as naar has a hard, smooth, shiny surface and a fairly high tensile strength and is a popular material for baskets.

As naar products are longer lasting, this raw material is much more expensive than the delicate leaf. The palm leaves are harvested in the month of April and May and left to dry under sunlight for a day. The dried leaves are stored in places where it doesn't come in contact with water. The leaflets at the base of the fan-shaped leaf are known as "throw leaflets" and those at the tip is known as "nose leaflets". The artisan removes these because they are too short and narrow to use for basket weaving. The dried palm leaves are washed with plain water and the excess water is rinsed. The midrib of the leaf is removed with the help of sathagam (knife) and the leaf is cut into strips of required size with the help of a cutting machine locally called as Ole machine. These strips are then taken for dying process. Before weaving, the basket water is sprinkled on the strips to keep them moist and avoid breakages while weaving. Based on the required size of the basket the palm stripes are arranged vertically and horizontally interlocking each other. Over that a wooden slab is placed on it and held with hands and feet for support.

Once the base is weaved the strips are bent and the sidewalls of the baskets are interlaced and weaved till the required length. At the end, the midrib of the leaf is used as a rim and weaved at the mouth of the basket with a thread for strength and enhancing the outlook of the product. Since palm leaf baskets are flexible and are easily deformed they have to be double-layered and reinforced at the rim with a stronger material. The excess strips are folded and interlocked inside the basket in a manner that the ends are not visible. Beads are pasted or weaved on the baskets to embellish. Mainly women artisans are engaged in making these baskets. The baskets making are done in a traditional way. The woven baskets are used for the purpose of storing food and grains.

The process of palm leaf basket preparation



Source: Prof. Bibhudutta baral, B. Srikanth and Tejesh j. Palm Leaf Basketry

Palmyra fiber products:

Palmyra fibre is a natural fibre that derives from treatment of the leaf sheaths of the Palmyra Palm and is produced in souther and eastern India. Bassine is inexpensive and durable. Its sweeping qualities are fair, but it is not resilient and may distort in use especially when wet. Bassine is shipped in bundles ready to use in a brush-making machine, which makes it very attractive to the brush manufacturer. It is used in cheaper warehouse brooms, in mixtures for scrubbing brushes, and in cheaper household brushes and brooms. The fiber is sorted in grades.

Palm fiber made products:



Source: <http://www.kelpalm.com/palmyrafibre.htm>

Palmyra Fiber is very strong and hardwearing, making it ideally suitable for semi-stiff sweeping brooms. It is also suited to the manufacture of scrub brushes. However, its properties can be markedly improved by the addition of a second material, either Mexican Tampico Fibre to produce a completely natural filling material, or PVC/PPN to create a semi-synthetic Union Mixture. The addition of Tampico Fibre increases the liquid carrying properties of Palmyra Fibre quite dramatically. Palmyra Fibre is very light in density, and is relatively low cost making it the perfect choice for low cost domestic brushware.



Source: <http://www.kelpalm.com/palmyrafibre.htm>

This material is derived from the stalks of the Palmyra palm in Southern India mainly in Kerala State. The best material comes from an area around Palakkad, and is available in various grades of stiffness. Bassine is inexpensive and durable, and its sweeping qualities are fair, but it is not resilient and may distort in use especially when wet. As with most of the other vegetable fibres it has good resistance to heat and most chemicals. Bassine is shipped in bundles ready to use in a brush-making machine, which makes it very attractive to the brush manufacturer. It is used in cheaper warehouse brooms, in mixtures for scrubbing brushes, and in cheaper household brushes and brooms. The natural colour of Palmyra fibre is a dark brown, that can be dyed, and when is black dyed is usually called Bassine.

Palm-leaf manuscript

Palm-leaf manuscripts are manuscripts made out of dried palm leaves. Palm leaves were used as writing materials in the Indian subcontinent and in Southeast Asia dating back to the 5th century BCE and possibly much earlier. The text in palm leaf manuscripts was inscribed with a knife pen on rectangular cut and cured palm leaf sheets; colourings were then applied to the surface and wiped off, leaving the ink in the incised grooves. Each sheet typically had a hole through which a string could pass through, and with these the sheets were tied together with a string to bind like a book. The individual sheets of palm leaves were called Patra or Parna in Sanskrit (Pali/Prakrit: Panna), and the medium when ready to write was called Tada-patra (or Tala-patra, Tali, Tadi). The famous 5th-century CE Indian manuscript called the Bower Manuscript discovered in Chinese Turkestan, was written on birch-bark sheets shaped in the form of treated palm leaves.

Palm leaf manuscripts of 16th century in Odia script.



Source: https://en.wikipedia.org/wiki/Palm-leaf_manuscript

Olden days Palmyra products:

The following products were manufactured, marketed and used in olden days.

1. Palm sugar
2. Palm candy
3. Palm gur
4. Palm chocolates
5. Sugarcane sugar
6. Toffee making
7. Lemon drops
8. Palm jelly
9. Palm jam
10. Palmyra fiber brushes
11. Palm juice
12. Palm syrup
13. Natics
14. Proof stick
15. Palmyra rope etc.

Some of these products are no more but; those are not produced in current scenario. So, need special attention for motivate these workers providing sufficient training and financial support to palm product developments.

Conclusion:

Thus, the Palmyra tree plays an important role in human life. Every part of the tree is using for various types of products and it gives more health benefits. But everyone is not aware about this tree. So, we should make more awareness programs regard Palmyra products. The government not offers facilities or subsidies to improve the Palmyra grower's. So, these workers are struggling to improve their work. It also affects the country's economic level. If the state and central government provide some assistance, their poverty may remove and they produce many more new products from these palm materials. The palm board started but not forecasting effectively, necessary steps required.

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