



GI APPLICATION No. 641

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**KERALA AGRICULTURAL UNIVERSITY**  
**DIRECTORATE OF RESEARCH**

Prof. (Dr.) P. Indira Devi  
Director of Research

GI APPLICATION No.

641

Main Campus, Vellanikkara  
KAU P.O. 680656  
Thrissur, Kerala

No.R8/60985/14

Dated: 16.12.2018

To

The Registrar of Geographical Indications,  
Geographical Indication Registry  
Intellectual Property Office Building  
GST Road, Guindy, Chennai 600 032, Tamil Nadu.

Sir,

Sub: KAU – DoR – GI Registration of Tirur Vettala (Tirur Betel Leaf) – application –  
submitting of - Reg.

Ref: No. IP No.168/18-19 dt 30/11/2018 of Coordinator IPR Cell-KAU

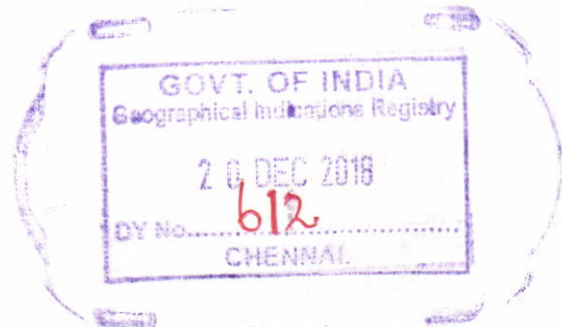
I may inform that IPR Cell, Kerala Agricultural University is supporting farmers and producers for registering unique products as Geographical Indications. I am hereby enclosing the application for GI Registration of Tirur Vettala (Tirur Betel Leaf) along with supporting/ legal documents and DD amounting to Rs. 5000/- (DD No. 313958 dtd. 24/10/18) as application fee for favour of necessary action.

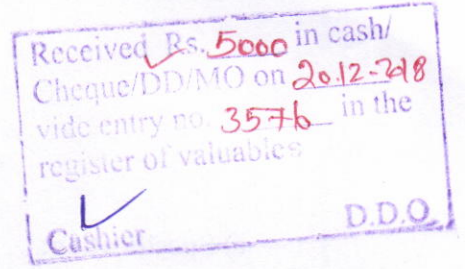
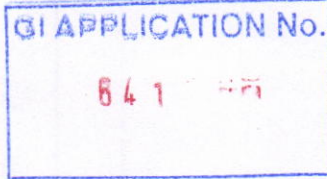
Yours faithfully

**P.INDIRA DEVI**

Copy of documents enclosed :

1. Form GI – 1 A in triplicate
2. Statement of case in triplicate
3. Geographical Map of the Area in triplicate
4. Logo of the Product
5. DD No. 313958 dated 24/10/2018 in favour of Registrar of Geographical Indications for Rs.5000/-
6. Affidavit in Rs. 100/- stamp paper
7. Additional representation of GI ( 5 copies).
8. Copies of documents to support proof of origin (13 Attachments)
9. List of members of the society as on 02/08/2018
10. Registration certificate – copy
11. Bylaw of the society – copy





Form G1 – 1 (A)

**Application for the Registration of a Geographical Indication in Part A of the Register, Section 11 (1), Rule 23(2)**

1. a) **Name of the applicant/applicants** : *Tirur Vettila Ulpadaka Sangam*
- b) **Address** : Tirur Vettila Ulpadaka Sangam  
Chembra, C/o Krishibhavan, Tirur  
Tirur-Chamaravattom Road,  
Alingal, 676108  
Malappuram Dist., Kerala.
- Facilitator** : IPR Cell, Kerala Agricultural University.  
Email: iprcell@kau.in; Mob: 9447878968
- Address** : IPR Cell-KAU,  
Agricultural Research Station,  
Kerala Agricultural University,  
Mannuthy  
Thrissur-680 651, Kerala, India
- c) **List of Association of Persons /Producers** : List provided separately as Annexure - 1
- d) **Type of goods** : **TIRUR BETEL LEAF ( TIRUR VETTILA)** falling in Class 31



#### e) Specification:

Tirur Betel leaf (Tirur vettila) is the betel leaf produced in Tirur and nearby areas of Malappuram District of Kerala. In Malayalam it is known as *Tirur Vettila*. *Puthukodi* and *Nadan* are the most common betel vine cultivars in Tirur area of Malappuram district. *Puthukodi* cultivar is mainly grown as pure crop as groups/clusters (*Kootams*) and this system of cultivation is known as '*koottakodi*' ('*Kootam*' means 'group' and '*kodi*' means 'vine' in Malayalam). *Puthukodi* have maximum leaf weight per unit area and optimum leaf parameters and has more acceptance and price in market. The leaves of *Puthukodi* are mainly marketed to other countries (Pakistan, Afghanistan and Bangladesh) and other states. *Nadan* cultivar is mainly cultivated as an intercrop on coconut and arecanut trees which provide support to betel vine. This system is known as '*ottakkodi*' ('*Otta*' means 'single' and '*kodi*' means 'vine').

The specific morphological and biochemical characteristics of Tirur betel leaf in comparison with betel leaf from Muvattupuzha are provided in Table 1 and 2. The leaves of *Puthukodi* are green in colour, with petiole length ranging from 1.20 - 5.50 cm, leaf length of 14-22 cm, leaf width of 7.50 -13.50 cm, leaf tip angle of 34<sup>0</sup>-37<sup>0</sup> (narrow), leaf weight of 4.0- 4.3g/leaf. Leave base is cordate in shape with even margins. Leaf lamina shape is mostly ovate elliptic, rarely ovate lanceolate. Leaf weight per unit area is more in *Puthukodi* than other common cultivars of the state and this contribute to more keeping quality. Leaf weight per unit area is 0.026-0.028 g/cm<sup>2</sup>.

Betel leaves from *Nadan* cultivar are having more leaf area, leaf size and green colour than *Puthukodi* with leaf length of 13-18 cm, leaf width of 7.70 - 14.00 cm, leaf area of 180-187 cm<sup>2</sup>, leaf tip angle of 41<sup>0</sup>-45<sup>0</sup> (medium) and leaf weight of 4.0 - 4.1 g/ leaf. Leaf base are mostly cordate in shape and rarely round; leaf lamina shape is ovate-lanceolate, rarely cordate with even margins. Leaf apex is acuminate. Leaf weight per unit area is 0.021- 0.022 g/cm<sup>2</sup>. In visual



appearance *Nadan* will have broader leaves than *Puthukodi*. *Nadan* shows early lateral branching than *Puthukodi*.

**Table 1. Morphological characters of Tirur vettila in comparison with Muvattupuzha local vettila**

Sl. No	Characters		<i>Tirur Vettila cultivars</i>		<i>Muvattupuzha Local</i>	
			<i>Puthukodi</i>	<i>Nadan</i>		
1	Internodal color in	Orthotropic shoot	Green with purple color at nodal region	Green with purple color at nodal region	Green with purple color at nodal region	
		Lateral branch	With spike	Green	Green	Green
			Without spike	Purple color with light green broken stripes	Purple color with light green broken stripes	Purple color with light green broken stripes
2	Lateral branch pattern		Hanging	Mostly hanging, rarely horizontal	Mostly hanging, rarely horizontal	
3	Shoot tip color		Dark purple color with broken green stripes	Dark purple color with broken green stripes	Dark purple color with broken green stripes	
4	Leaf color		Green	Green	Green	
5	Leaf length (cm)		14.00 – 22.00	13.00 -18.00	13.00 -14.00	
6	Leaf width (cm)		7.50-13.50	7.70-14.00	11.00 -12.00	
7	Leaf area (cm <sup>2</sup> )		152-159	180-187	160-169	
8	Leaf petiole length (cm)		1.20-5.50	1.20-6.00	3.0-3.60	
9	Leaf lamina shape		Mostly ovate elliptic, rarely ovate lanceolate	Mostly ovate lanceolate, rarely cordate	Mostly ovate elliptic, rarely cordate	
10	Leaf base shape		Cordate	Mostly cordate, rarely round	Mostly cordate, rarely round	
11	Leaf tip angle (°)		Narrow (34-37)	Medium (41-45)	Medium (40-43)	
12	Leaf apex shape		Aristulate	Accuminate	Apiculate	
13	Leaf margin		Even	Even	Even	
14	Spike length (cm)		2.50-2.70	2.30-2.50	2.60-2.70	
15	Days to lateral branching		130.00 -136.00	82.00-87.00	125 -130	
16	Days between lateral branch emergence		17-20	16-20	21-24	



17	Angle between orthotropic shoot and leaf petiole ( $^{\circ}$ )	49-50	59-60	57-58
18	Leaf weight (g/leaf)	4.0 - 4.3	4.0 - 4.1	3.4 - 3.7
19	Leaf weight per unit area (g/cm <sup>2</sup> )	0.026-0.028	0.021-0.022	0.020-0.022

Leaves of Muvattupuzha cultivar are green in colour with leaf length of 13-14 cm (less than Tirur cultivars), leaf width of 11-12 cm, leaf area of 160-169 cm<sup>2</sup>, leaf tip angle of 40<sup>0</sup>-43<sup>0</sup> (medium) and leaf weight of 3.4-3.7g. Leaf base are mostly cordate in shape, rarely round, with even margins. Leaf apex shape is apiculate.

**Table 2. Biochemical characters of Tirur betel leaf in comparison with Muvattupuzha cultivar.**

Sl. No.	Biochemical characters	Tirur betel leaf		<i>Muvattupuzha</i>
		<i>Puthukodi</i>	<i>Nadan</i>	<i>Local</i>
1.	Total chlorophyll (mg/g)	2.42-2.44	2.54-2.56	2.25-2.26
2.	Total protein (mg/g)	3.21-3.25	3.76-3.79	3.09-3.11
3.	Total phenol content (g/100g)	3.06-3.07	2.68-2.71	2.46-2.49
4.	Antioxidant capacity ( $\mu$ g ascorbic acid/mg)	7.41-7.58	7.01-7.05	6.80-6.83
5.	Yield of essential oil (v/w %)	0.48-0.51	0.45-0.48	0.56-0.58
6.	Eugenol (%)	15.22-15.34	16.25-16.34	11.00-11.15
7.	Methyl eugenol (%)	-	0.80	-
8.	Isoeugenol (%)	0.78-0.82	0.78-0.82	0.78-0.82
9.	Methyl isoeugenol (%)	0.25-0.32	0.08-0.12	1.40-1.55
10.	Pungency	Medium	Medium	Less



Tirur betel leaf has significantly **high content of total chlorophyll and protein in fresh leaves** than Muvattupuzha cultivar. Nadan has more chlorophyll content of 2.54-2.56 mg/g and hence more green colour whereas Puthukodi has 2.42-2.44 mg/g and have slightly less green colour. Total chlorophyll content in Muvattupuzha type is less (2.25-2.26 mg/g.) than Tirur betel leaf. The protein content is also high in Tirur Vettala. Nadan has a protein content of 3.76-3.79mg/g and Puthukodi 3.21-3.25mg/g. Muvattupuzha local has slightly less protein content of 3.09-3.11mg/g. **Total phenol content is also more in Puthukodi (3.06-3.07 g/100g) and Nadan (2.68-2.71 g/100g) compared to Muvattupuzha betel leaf(2.46-2.49g/100g).**

The antioxidant capacity is an important biochemical parameter contributing medicinal properties to betel leaf. Antioxidant capacity is contributed by several molecules like vitamin B1, B2 and E, as well as several phenolic compounds (Syta, 2014). Antioxidant activity includes free radical scavenging capacity, inhibition of lipid peroxidation, metal ion chelating ability and reducing capacity. Free radicals play a vital role in most major health problems like cancer, rheumatoid arthritis, cardiovascular diseases, alzheimer's disease and other neurodegenerative disorders. Antioxidants scavenge these free radicals and proved to be beneficial for these disorders as they prevent damage against cell proteins, lipids and carbohydrates (Chakraborty and Shah, 2011). **The antioxidant capacity is more in Tirur betel leaf adding to its medicinal properties.** In Puthukodi it is 7.41- 7.58 µg ascorbic acid/mg whereas in Nadan it is 7.01 – 7.15 µg ascorbic acid/mg. Due to high antioxidant property Tirur betel leaf has more medicinal properties than the local cultivar. This betel leaf had great potency to act as natural antioxidant and hence has anticancer properties. The consumption of antioxidant rich foods would help to neutralize the free radicals in the body, thus preventing or delaying the oxidative damage to lipids, proteins and nucleic acids.

**Tirur betel leaf is more pungent than many other cultivars.** Eugenol is the major essential oil in betel leaf adding to pungency. Tirur betel leaf have



15.22-16.34 % eugenol followed by methyl isoeugenol with a range of 0.08-0.32% and these contents contribute to the more pungency of Tirur betel leaf. High eugenol content gives better **antifungal and antioxidant properties to Tirur betel leaf**, compared to local cultivar. The isoeugenol content in Tirur betel leaf is 0.78-0.82%.

#### **Medicinal properties of betel leaf:**

Eugenol in betel vine is an excellent antimutagen. It could be used as a local anesthetic for tooth ache. Eugenol with its antioxidant property makes Tirur betel leaf a probable candidate in the treatment of diseases. "Thampooladhi Tylam" is an Ayurvedic preparation made with betel vine extract. Betel leaf extract improves oral health and reduces respiratory problems. An indigenous medicine to treat cough is prepared by boiling betel leaf in water. It is also used in perfumeries, flavorings and medicine as a local antiseptic and anesthetic. Methyl isoeugenol is a natural food flavor. Hence, Tirur betel leaf have potential use in food flavours and medicines.

Eugenol, hydroxyl chavicol and terpenyl acetate are the chief ingredients of betel leaf oil and these impart medicinal, aromatic, stimulant and digestive properties to betel leaf. The essential oil contained in the leaves possess antibacterial and antifungal properties. Hence betel leaf has a promising industrial future as a raw material for manufacturing digestive agents, cosmetics, skin tonics, tooth pastes, perfumes, de-odorants, soaps, antiseptic creams etc.

Betel leaves possess very high antioxidant properties and in some types it is more than that of tea. Betel leaf extract has strong hydroxyl radical and superoxide anion radical scavenging property. Polyphenol compounds like catechol, allylpyrocatechol etc. in betel leaf extract inhibit the radiation induced lipid peroxidation process effectively, due to the ability to scavenge free radicals. The antioxidant property is correlated with different biological activities like



hepatoprotective, antidiabetic, antistroke and anticancer properties. The leaf extract gives relief from back pain and muscular tensions.

**f) Name of the GI and particulars of Tirur Betel Leaf (Tirur vettila).**

Name of the GI- Tirur betel leaf (Tirur vettila)

**Logo:**



Betel leaf is often called as “Green Gold of India”. In Malayalam it is known as *Vettila*. Even though it is commonly used for making pan masala for chewing, it has many medicinal, industrial and cultural usages also. Due to its medicinal property it is used in *Ayurveda* system of medicine. In India betel leaf is routinely served during social, cultural and religious occasions. It is believed that betel leaf helps digestion of food.

In Kerala, Malappuram district is well known for betel leaf cultivation. Tirur, Tanur, Tirurangadi, Kuttippuram, Malappuram and Vengara are the block panchayaths in Malappuram District famous for cultivation of Tirur betel leaf. Betel leaf from Tirur, famous as Tirur Vettila, is exported to Pakistan and North Indian states and is also sold in local markets.



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Popular cultivars of the area are *Puthukodi* and *Nadan*. Of the two major types *Puthukodi* is the major type and is mainly cultivated under “*Koottakkodi*” system as pure crop for exporting to other countries and North Indian states whereas *Nadan* is cultivated as intercrop in coconut and arecanut gardens under *ottakkodi* system for sale in local markets. The betel leaves from lateral branches of betel vine are locally known as ‘*Kannivettila*’ whereas leaves from main orthotropic stem are known as ‘*Pathivettila*’. *Kanni vettila* has more market value than *pathi vettila*. *Kannivettila* from *Puthukodi* cultivar is used for export purpose. *Kannivettila* are sold in domestic markets in Tirur, Kozhikode and Kunnankulam.

Tirur betel leaf is more pungent than betel leaf produced in other areas. It has high eugenol content and antioxidant properties, imparting medicinal properties. Its freshness is retained for a longer period due to more leaf thickness. Moreover the optimum leaf characteristics provide more market value to this product. Organic method of cultivation is adopted to maintain the freshness and uniqueness of Tirur *Vettila*. Traditional knowledge in cultivation, harvesting, packaging and local cultivars add to the uniqueness of this product.

#### **Geomorphology and soil types**

Geomorphologically, Malappuram district can be divided into three viz. coastal plain (less than 7.5 mamsl) mid land (7.5 – 75 mamsl) and highland (above 75 mamsl). The coastal plains extend as a narrow stretch of land lying along the coast from Kadalundi Nagaram in the north to Ponnani in the south. It becomes very narrow towards north of Tirur and the maximum width is seen along Chauravallam - Tirurangadi area. The area lying between the coastal plain in the west and the high ranges in the east is occupied by midlands. This is the most prominent physiographic unit of the district. This is characterized by flat topped hillock with steep ‘U’ shaped valleys and ridges. The valley forms potential area for agriculture including paddy, arecanut, vegetable, banana and coconut and betel vine. The hill tops are generally barren and covered by thick and compact laterite. The eastern parts of the district are characterized by steep



hills, gorges and escarpments. The elevation of the hill ranges goes up to 1127 mamsl. Most of the high lands are occupied by forests (Source: Ground water information booklet of Malappuram district, Kerala state).

The district of Malappuram is famous for lateritic soil and has a unique importance in the geological history. Laterite was first identified in the area near Angadippuram Railway Station in this district by Francis Buchanan. Alluvial soils are mainly seen along the coastal plains and valleys. The soils range from exclusively drained to moderately/well drained sand to sandy clay in nature. Forest loamy soils are deep or very deep and well drained with loamy to clayey textures and having fairly high gravel content.

### Climate

The district has more or less the same climatic conditions prevalent elsewhere in the State viz. dry season from December to February and hot season from March to May, the South-West monsoon from June to September and the North East monsoon from October to December. The average rainfall of the area is 205.92 cm. Out of this, major rainfall contribution is from SW monsoon followed by the NE. The South West monsoon is usually very heavy and nearly 73.5% of the rainfall is received during this season. NE monsoon contributes nearly 16.4% and summer rain contributes nearly 9.9% and the balance 0.2% is accounted for January and February months. The average weather data of Malappuram district for last 10 years is provided below.

**Table 3. Average weather data of Malapuram district for 10 years (2004-2013)**

Month	Min. Temp. (°C)	Max. Temp. (°C)	Rainfall (cm)
January	18.13	34.49	1.16
February	20.13	35.49	5.12
March	21.64	36.43	31.86
April	22.06	36.11	68



May	22.99	34.71	145.61
June	21.57	31.03	600.35
July	20.11	29.49	615.5
August	20.50	30.30	315.97
September	20.45	30.46	287.07
October	20.63	31.34	271.81
November	19.96	31.65	117.24
December	18.21	32.74	11.36

Source: Agricultural Research Station, Anakkayam P.O., Malappuram, Kerala Agrl. Uty.

The climate is generally hot and humid. March and April months are the hottest and January and February months are the coldest. The maximum temperatures ranges from 29.49°C to 36.43°C and the minimum temperature ranges from 18.13°C to 22.99°C. The temperature starts rising from January and reaches the peak in the month of March and April and then decreases during the monsoon month and again rising from September onwards (Table.3).

The relative humidity ranges from 84 to 94 % during morning hours. The humidity is more during the peak monsoon months from June to September.

The wind is predominant from east as well as west during morning and evening hours. The wind speed is more during December to February months. It ranges from 2.9 to 7.2 km per hour.

#### **g) Description of the good:**

Betel leaf (*Piper betel*) is the leaf of betel vine belonging to the Piperaceae family, which includes black pepper. It is valued both for its mild stimulant action, digestive and medicinal properties. Betel leaf is mostly consumed in Asia and elsewhere in the world by some Asian emigrants. The betel plant is an evergreen and perennial creeper, with glossy heart-shaped leaves and white catkin. According to traditional Ayurvedic medicine, chewing areca nut and betel leaf is a remedy for bad breath and to improve digestion.



Tirur betel vine is mainly cultivated in Tirur, Tanur, Tirurangadi, Kuttippuram, Malappuram and Vengara block panchayaths of Malappuram District. Betel leaf produced in Malappuram District of Kerala is known as *Tirur betel leaf* (Tirur Vettila in Malayalam). *Nadan* and *Puthukodi* are the major cultivars of the area. *Puthukodi*, the common type, is mainly cultivated as pure crop as groups/clusters (Kootams) and the system of cultivation is known as *koottakodi* ('Kootam' means 'group' and 'kodi' means 'vine'). *Nadan* is mainly cultivated as intercrop on coconut and arecanut trees which provide support to betel vine. This system is known as *ottakkodi*. The leaves of *Puthukodi* are mainly marketed to other countries (Pakistan, Afghanistan and Bangladesh) and other states where as *Nadan* is marketed to local markets.

The specific morphological and biochemical characteristics of Tirur betel leaf in comparison with betel leaf from Muvattupuzha are provided in Table 1 and 2. The leaves of *Puthukodi* are green in colour, with petiole length ranging from 1.20 - 5.50 cm, leaf length of 14-22 cm, leaf width of 7.50 -13.50 cm, leaf tip angle of  $34^{\circ}$ - $37^{\circ}$  (narrow), leaf weight of 4.0- 4.3g/leaf. Leaf base is cordate in shape with even margins. Leaf lamina shape is mostly ovate elliptic, rarely ovate lanceolate. Leaf weight per unit area is more in *Puthukodi* than other common cultivars of the state and this contribute to more keeping quality. Leaf weight per unit area is 0.026-0.028 g/cm<sup>2</sup>.

Betel leaves from *Nadan* cultivar are having more leaf area, leaf size and green colour than *Puthukodi* with leaf length of 13-18 cm, leaf width of 7.70 - 14.00 cm, leaf area of 180-187 cm<sup>2</sup>, leaf tip angle of  $41^{\circ}$ - $45^{\circ}$  (medium) and leaf weight of 4.0 - 4.1 g/ leaf. Leaf base are mostly cordate in shape and rarely round; leaf lamina shape is ovate-lanceolate, rarely cordate with even margins. Leaf apex is acuminate. Leaf weight per unit area is 0.021- 0.022 g/cm<sup>2</sup>. In visual appearance *Nadan* will have broader leaves than *Puthukodi*. *Nadan* shows early lateral branching than *Puthukodi*.



**Table 4. Morphological characters of Tirur vettila in comparison with Muvattupuzha local vettila**

Sl. No	Characters	<i>Tirur Vettila cultivars</i>		<i>Muvattupuzha Local</i>
		<i>Puthukodi</i>	<i>Nadan</i>	
1.	Leaf color	Green	Green	Green
2.	Leaf length (cm)	14.00 – 22.00	13.00 -18.00	13.00 -14.00
3.	Leaf width (cm)	7.50-13.50	7.70-14.00	11.00 -12.00
4.	Leaf petiole length (cm)	1.20-5.50	1.20-6.00	3.0-3.60
5.	Leaf lamina shape	Mostly ovate elliptic, rarely ovate lanceolate	Mostly ovate lanceolate, rarely cordate	Mostly ovate elliptic, rarely cordate
6.	Leaf base shape	Cordate	Mostly cordate, rarely round	Mostly cordate, rarely round
7.	Leaf tip angle ( $^{\circ}$ )	Narrow (34-37)	Medium (41-45)	Medium (40-43)
8.	Leaf apex shape	Aristulate	Accuminate	Apiculate
9.	Leaf weight (g)	4.0 - 4.3	4.0 - 4.1	3.4 - 3.7
10.	Leaf weight per unit area ( $g/cm^2$ )	0.026-0.028	0.021-0.022	0.020-0.022

**Table 5. Morphological characters of Tirur vettila in comparison with Mysore Betel leaf**

Sl No.	Character	<i>Puthukodi</i> betel leaf	Mysore betel leaf
1.	Leaf color	Green	Light green
2.	Leaf length (cm)	14.00 – 22.00	20
3.	Leaf width (cm)	7.50-13.50	11
4.	Leaf petiole length (cm)	1.20-5.50	2
5.	Leaf lamina shape	Ovate elliptic,	Ovate
6.	Leaf base shape	Cordate	Cordate
7.	Leaf apex shape	Aristulate	Shortly acuminate
8.	Leaf blade	Glabrous	Glabrous
9.	Spike length (cm)	2.60	7

Source: <http://ipindiaservices.gov.in/GirPublic/Application/Details/34>

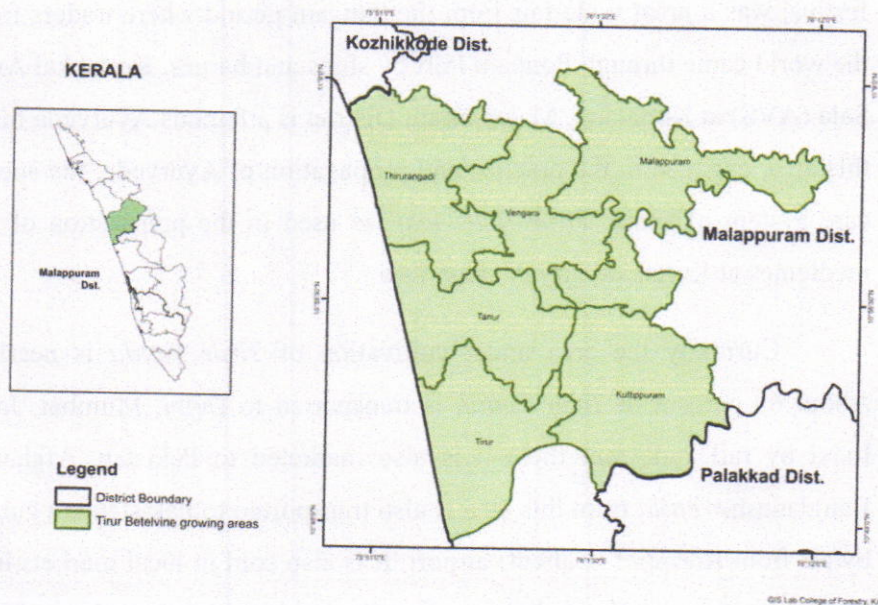
The major differences seen between *Puthukodi* and Mysore cultivar are in leaf colour, leaf shape and spike length. The colour of the betel leaf is green in *Puthukodi* whereas it is light green in Mysore cultivar. Mysore cultivar is having a spike length of 7cm while in *Puthukodi* it ranges between 2.30-2.70cm. Leaf lamina shape is ovate elliptic whereas in Mysore betel leaf it is ovate. Leaf apex shape is aristulate, whereas in Mysore betel leaf it is shortly acuminate.



Betel and areca take a prominent place in all ceremonial occasions. At every religious and social function they are in evidence. Every present to a Brahmin on religious occasions must be accompanied with them. There is a special gift (*dhakshina*) known as *Tamboola Danam* where bundles of betel leaves with areca are given to a Brahmin along with cash prize. At every social function when guest arrive, betel leaf will be served for chewing.

**h) Geographical area of production and map.**

Area of Tirur Betelvine Cultivation (Block Panchayaths) in Malappuram District



Malappuram literally means an elevated place on the top of hills. Malappuram district lies between North latitudes  $10^{\circ}40'$  and  $11^{\circ}32'$  and East longitude  $75^{\circ}50'$  and  $76^{\circ}36'$ . The area of production of Tirur vettila lies between  $11^{\circ} 9' 37.07''$  N  $76^{\circ} 0' 33.414''$  E (North),  $10^{\circ} 47' 4.682''$  N  $75^{\circ} 54' 46.23''$  E (South),  $11^{\circ} 4' 33.96''$  N  $76^{\circ} 12' 27.565''$  E (East) and  $11^{\circ} 7' 17.637''$  N  $75^{\circ} 49' 35.282''$  E (West). The Nilgiris of Tamil Nadu in the East and Arabian Sea in the West provide natural boundaries to the district. In the North it is bounded by Kozhikode and Wayanad district and in the South by Palakkad and Trichur districts.



Tirur is a municipal town in Malappuram district spreading over an area of 16.55 km<sup>2</sup>. It is the birth place of Thunchath Ezhuthachan, the father of Malayalam language. During 2012, The Malayalam University was established at Tirur. Tirur is one of the most important business centers of Malappuram district and is situated 26 km west of Malappuram and 41 km south of Kozhikode, on the Shoranur–Mangalore section of the Mangalore–Chennai railway line. Tirur is a major trading centre of fish and betel leaf in Malappuram district. Tirur is also famous for the *Mamankam* festival celebrated at Thirunavaya. *Mamankam* festival was a great trade fair from the Sangam period where traders from around the world came through Ponnani Port by ships and barges. Kottakkal Arya Vaidya Sala (AVS) at Kottakkal, Malappuram District is a famous Ayurveda Institution in this area, engaged in the practice and propagation of Ayurveda, the ancient health care system of India. *Tirur Betel leaf* is used in the preparation of Ayurvedic medicines at Kottakkal AryaVaidya Sala.

Currently the area under cultivation of *Tirur Vettila* is nearly 266 ha. About 60 percent of *Tirur Vettila* is transported to Delhi, Mumbai, Jaypore and Itarsi by rail and from there it is also marketed to Pakistan, Afghanistan and Bangladesh. *Vettila* from this area is also transported to Pakistan *via* gulf countries by air from Karippur (Calicut) airport. It is also sold in local markets in Thrissur, Malappuram and Calicut districts. Details of block panchayaths in Malappuram districts with Tirur Vettila cultivation are provided below.

**Table 6. Details of block panchayaths in Malappuram districts with Tirur Vettila cultivation.**

Sl.No.	Name of Block Panchayath	Area of cultivation (Ha)
1	Tanur	52
2	Kuttiapuram	62.5
3	Tirur	105
4	Malappuram	24
5	Tirurangadi	2
6	Vengara	20
TOTAL		265.5

Source : Office of the Principal Agricultural Officer, Malappuram





**I) Proof of origin:**

In Kerala betel leaf and areca take a prominent place in all ceremonial occasions. At every religious and social function they are in evidence. Every present to a Brahmin on religious occasions must be accompanied with them. There is a special donation known as *Tamboola Danam* where bundles of betel leaves with areca are given to a Brahmin along with some money. At every social function when guest arrive, they are served with these along with *chunnambu* (lime) and spices for chewing.

Mention about Tirur vettila is seen in ancient literature. Many books cited the importance of Tirur for betel vine cultivation and its marketing. Some major historical documents are given below:

1. In 1800 Lord Wellesley, the British Governor General of India, appointed the surgeon and botanist Francis Buchanan(1762-1829) to conduct a survey of the kingdom of Mysore in the south of the country, which had been annexed by the East India company. In the resulting three-volume report entitled "A Journey from Madras through the country of Mysore, Canara, and Malabar", first published in 1807, Buchanan (later known as Francis Hamilton) recorded the agriculture, arts and commerce, indigenous regions and custom, natural history and society and antiquities of the regions through which he travelled and illustrated his text with a map and engravings. Vol. 2 of this book was later translated to Malayalam by Dr. C. K. Kareem and published by State Institute of Languages, Kerala, Thiruvananthapuram in 1981 (Ref.6). In this book Francis Buchanan mentioned about the betel vine cultivation in Malabar Coast. He mentioned betel vine as the major agricultural crop of Valancherry area (*Francis Buchanante Keralam*. page 44,154,164-165: copy enclosed Attachment 1). Translation & Transliteration are appended below



## **Translation/ Transliteration of the non-English text**

### **Translation of book Francis Buchanante Keralam**

#### **a. Page 44, First Paragraph under the heading 'Malabar Christians'.**

In this Paragraph Francis Buchanan described about a place called 'Kannam Kulangara Angadi'. This beautiful place is situated in high altitude area surrounded by betel vine plantations.

#### **Corresponding Transliteration:**

Manoharamaya vettilathottaghalkidayil alpam uyarna stalathu stithi cheyunna Kannam Kulangara Angadi enna pradesham kazhchayil kauthukamullathanu.

#### **b. Page 155- Under the heading 'Plantation crops'.**

1. In the book it is continued that interaction with farmers in Valancherry area, revealed that Coconut, Betel vine, Pepper and Jack fruit are the major plantation crops in this area".

#### **Corresponding Transliteration:**

Chila prathanapetta krishikarumayi nadathiya sambashanaghalil ninnum eviduthae thottaghalil krishiyirakunna vibhavangal thenghu, vettila kodi, kurumulaku kodi, plavu enivayanennu manasilakan sathichu.

2. Tirur vettila is mentioned in the book "Kerala District Gazetteers - Malappuram"(1986) compiled by Dr. C. K. Kareem and published by Adoor K.K. Ramachandran Nair, State Editor, Kerala Gazetteers, Trivandrum printed at Government Press, Ernakulam (Ref.9). In this book he has mentioned about area under betel leaf cultivation. In Malappuram it was cultivated at an area of 300 ha and Tirur was described as famous for betel leaf cultivation. It was exported to all parts of India from Tirur railway station. About 15 tons of betel leaves were sent to North Indian states and everyday about one ton of betel leaves were sent to other parts



of the State (Kerala District Gazetteers page 332: copy enclosed Attachment 2). It was considered as a labour oriented cultivation which absorbs a good number of people. He also described that betel leaves and arecanut were the major commodities that arrived in Tirur market. Tirur taluk is an important centre for cultivation of betel leaves; it is brought to the market in large quantities from the surrounding areas. Every year about 8,00,000 number of betel leaf reached the market. According to District Gazetteers, Tirur betel leaf was cultivated at Tirur, Kuttippuram, Thirunavaya, Purathur, Vettom, Kalpakancherri, Valanchery, Valavannur, Anakkayam, Kottakkal, etc. Betel leaves were marketed to all parts of India. Tirur vettilla was also marketed from Manjeri market. To this market the product came from Tirur, Manjeri, Payyanad etc, and from there the leaves were dispatched to Calicut and Tirur. The betel leaves were brought to market as bundles. Nearly 8000 bundles of betel leaves *i.e.* 8 lakh leaves were marketed from Tirur. (Kerala District Gazetteers page 450-458: copy enclosed, Attachment 2).

3. "A History of Kerala" written in the form of "Notes on VISSCHER'S Letters from Malabar" by K.P. Padmanabha Menon (1986) and edited by Sahithyakusalan and TK Krishna Menon, published by Asian Education Services, New Delhi (Attachment 3, Ref.12) reported about cultivation of betel vine and areca in Malabar coast (page 417). He described that the word vettilla would have originated from veru + ila meaning simple or mere leaf which reached to English through the Portuguese *betre* and *betle*. Vasco da Gama used the term at "*Tambul*", Arabic from the Sanskrit 'tambula'. Marco Polo also noted the habit of chewing pan by the people of Malabar (page 417). The local terms of betel vine cultivation like "kooly kody", "kany kadotha kody", "kanny pattiadoo" "kody" etc. are also described in this book. In this book it is reported that vine attains the last period according to the quality of the soil. For one and a half, or two years the leaves are fit for plucking. It is propagated from cuttings and planted around the roots of trees, which is penetrated with its roots and



ascends to the height of ten or fifteen feet. It must be watered once every other day, and demands considerable attention to its cultivation. (Page 422: Copy enclosed).

4. "AghilaVighnanakosham" by T.N. Jayachandran and published by D.C. Book in 1998 (Attachment 4) mentioned about betel leaf cultivation in Tirur area. (Page 489: copy enclosed) Ref .7 Corresponding Translation & Transliteration are given below:

**Translation for reference in Page 489, of AkhilaVighnanakosam**

Betel leaf and fish are exported from Tirur.

**Transliteration:** Vettila, malhsayam enniva Tirur ninnum kayattiyayakkunnu.

5. The Encyclopaedic District Gazetteers of India edited by S.C.Bhatt and published by Gyan Publishing House in 1998 mentioned about cultivation of betel leaf as an intercrop in coconut and arecanut gardens in Malappuram area. Tirur is also a trading centre of fish and betel leaves. (Page 812,815: copy enclosed as attachments, Ref .2).
6. District Handbook of Kerala-Malappuram (2003) (Attachment 6) mentioned about Vettila cultivation in Malappuram (Page 27, 28: copy enclosed, Ref .4).
7. Articles written by K.A.Martin on 'Kaipad rice, Tirur betel leaf, Changalikoden Banana to get GI (The Hindu dt. 20/06/2012: copy enclosed as Attachment 7, Ref :10).
8. Articles written by K.R.Rajeev on 'KAU joins Tirur's battle for Pak betel market' (The Times of India dt. 17/12/2012: copy enclosed as Attachment 8, Ref: 16).



9. Article written by G.V.Nair, in 'Karshakashree,' a major Agricultural magazines of Kerala highlights mainly on Tirur betel vine farming methods due to its particular features (Karshakasree, February 2006 pages 28-30 copy enclosed as Attachment 9, Ref: 11).
10. Article written by Jose K.Vayalil, in 'Karshakashree,' a major Agricultural magazines of Kerala highlights the still ongoing fame of Tirur betel vine of older times (Karshakasree, April 2013 pages 32-34 copy enclosed as Attachment 10, Ref: 8).
11. Article written by Preethy T.T., Dr. C.R.Elsy and Dr.Berin Pathrose in 'Journal of Medicinal Plants Studies' on 'Preliminary study on spike characters of Betel vine especially from Tirur area' (Journal of Medicinal Plants Studies, 2017 pages 199-201 copy enclosed as Attachment 12, Ref: 17).
12. Article written by Preethy T.T., Dr. C.R.Elsy and Dr. C. Beena in 'Journal of Pharmacognosy and Photochemistry' on profiling of essential oil in Tirur vettilai (Journal of Pharmacognosy and Photochemistry', 2017 pages 774-778 copy enclosed as Attachment 13, Ref: 18).

**Method of cultivation:**

The lateritic soil of Malappuram is highly suited for betel vine cultivation. In Tirur area betel vine is cultivated as *Ottakkodi* and *Koottakodi* and the method of cultivation in these systems are described below . Both the systems are developed based on traditional technologies and traditional knowledge.

**Ottakkodi ( Otta means single, kodi means vine in Malayalam.):**

**a. Planting:** *Ottakkodi* is the intercropping of betel vine in arecanut and coconut gardens. These trees provide support and partial shade to the crop. *Nadan* is



commonly planted in this method and sometimes *Puthukodi* also. In *Ottakkodi* system planting is mainly done during *Thiruvathira njattuvela* that falls during *Edavam or Mithunam* months of Malayalam calendar ( May-June months of English calendar). Tender stem cuttings (*Kodithala*) of 0.5 - 1 m length are used as planting material that are planted in the basins of supporting trees. Two cuttings will be planted in each basin and will be covered with leaf to avoid drying of cuttings. As the cuttings grow and elongates they will be tied to the support tree with the help of *patta* (sheath base of areca nut leaf). Along with monsoon showers the shoot tips grow well and from 5-6 months onwards the harvesting of the leaves starts. During the next 18 months harvesting will be continued once within 20-25 days. During next *Kanni, Thulam and Virichigam* months of Malayalam calendar (October - December months ) the vine will be ready of replanting for next crop by *kodierakkivekkal*. In this operation the growing vines will be detached from the support trees, will be rolled and kept under soil in the basin of support trees keeping 3m vine tip out of soil. This shoot tip of 3m length will be tied to the support tree. Organic manures (cow dung/poultry manure/ goat manure/ groundnut cake etc.) will be applied in the basin of the vine. The shoot tip grows and produces new leaves like a new planting. Lateral branches will be produced within 3-4 weeks and harvesting start within 2 months, and continues for the next 14-16 months till the vine is ready for next *Erakkivekkal* in a different spot under the same support tree. A vine can be retained like this for 12-15 years if the vine is maintained properly and healthy without any damage.

**b. Manures and fertilizers:** Tirur betel vine is cultivated mainly adopting organic methods. Cow dung slurry and green leaf manures are applied at the time of fresh planting of stem cuttings. After few days of planting, when shoot tip start growing groundnut cake/ash is given along with ½ kg of cow dung. Cow dung and ground nut cake will be made as slurry and applied to tree basin. Sometimes dry cow dung powder mixed with ground nut cake powder will be applied to tree basin. Sometimes poultry manure and goat manure are also applied. Manures will be applied once in 15-30 days. 150-500 g of dry cow dung powder or poultry litter



will be applied along with ground nut cake @ 250 g/tree. To avoid rotting of leaves and vine, pseudomonas will also be applied normally. During rainy season cow dung slurry will be applied and during dry season cow dung powder will be applied.

c. **Irrigation**: Irrigation is to be given once in 2-3 days adopting pipe (Hose) irrigation or channel irrigation without damaging the vines. Sometimes traditional methods are also adopted.

### **Kootakkodi system of cultivation:**

#### **a. Planting:**

In *Kootakkodi* system betel vine is cultivated as a pure crop using *Puthukodi* cultivar. In this system planting is mainly done during *Thiruvathira Njattuvela* that falls during *Edavam* or *Mithunam* months of Malayalam calendar (May-June months). Circular basins of 3 ½ -4 ½ feet diameter will be prepared and in these circular basins 16 shoot cuttings of ½ m length will be planted. 8 poles (*varol*), prepared using dry arecanut/ toddy palm trunk will be erected as support for growing vines. These 8 plants will be known as *koottam* (one cluster). The spacing between vines will be 20 cm and between clusters it will be 4-5 feet. These erected poles will have two vertical layers. The first layer will be at an approximate vertical length of 5m. In this layer at a height of 4 feet, a circular band made of arecanut pole, known as '*Vala*', will be given as support and again at a height of 3 feet a circular support with iron wire will be provided. The poles of a *koottam* will be tied at the tip at a height of 5m. After 5m, the 2<sup>nd</sup> layer will be erected with small pieces of arecanut poles and this process is called as *Kudumpikettal*. The nearby clusters (*Kootams*) will be interlinked with bamboo poles (*ezhuka*) of bigger widths. This gives balance to clusters and help to avoid damage by wind. These structures are also required for harvesting to support *Eni* (climbing poles). At some places, the cluster will have 3 layers. The first layer will be of an approximate length of 3m. In this layer the poles will be bind



together with small pieces of arecanut stem and this process is called “*Vaari Kettuka*”. After 3 m, the 2<sup>nd</sup> layer will have a height of 5m. At a height 8m, (3m+5m) the poles will be joined with nearby clusters with the help of arecanut stem pieces, known as *Ezha*. Then above this layer the third layer of nearly 1-2m, will be formed with small pieces of arecanut stems known as “*Kalli*”. The betel vines will grow and spread on these *koottams* and the growing tips will hang from ‘*Vaari*’ of the top layer. According to spacing adopted there will be 5-7 clusters in one cent area. The tender shoot cuttings (2 numbers /pole) are used as planting material in the circular basins of supporting poles. As the shoot cutting grows it will be tied to the support pole with the help of *patta* (sheeth base of arecanut leaf). After 3 weeks, the cuttings grow well and from 6 months onwards vines produces lateral branches. Partial shade will be provided to young plants. Mulching of vines will be done with the help of green leaves and coconut leaves. The harvesting will be continued up to 2 years of planting , at an interval of once in 3-4 weeks. The leaves from lateral branches, harvested during November, December, January months are of best quality and is known as *Kannivettila*. These leaves fetches maximum price in the market, up to Rs.75-90/bundle (of 100 leaves). The leaves produced on the main stem are known as *pathi vettila*. These leaves are more brittle and the price is less (approximately Rs.10-20 /bundle). After 2 years the vines become weak and hence leaves become small and of low quality. So the vine will be discarded and removed to take fresh planting. The discarded vines and leaves will be sold for medicinal purpose. Rarely farmers will continue harvesting in third year also. *Kootakkodi* system is more remunerative than *ottakodi* system, even though initial cost is more. The yield is also more in *kootakkodi* system.

Farmers plant *koottams* in between crops like coconut, arecanut, banana and yams. Normally when betelvine is cultivated as intercrop the yield of main crop also increases. Manures and irrigation water applied to *vettila* may also add to the yield of main crop.



**b. Manures and fertilizers:**

Tirur *Koottakkodi* betel vine is cultivated mainly adopting organic method of cultivation. Cow dung slurry spray and green leaf manures will be applied at the time of fresh planting of cuttings. After few days of planting, when shoot tips start growing groundnut cake will be given along with ½ kg of cow dung. In traditional method, to apply cow dung slurry, manure pits (*Chanakakuzhi*) will be formed between clusters and from these pits with the support of shallow metallic baskets (*Thudippu*) this slurry will be applied to basin. Sometimes cow dung and ground nut cake together will be made as slurry and applied to basin. Dry cow dung mixed with ground nut cake powder will also be applied to tree basin (this avoid eating of ground nut cake by insects and animals). Manures will be applied once in 22-30 days. 150-500g of dry cow dung powder or poultry litter will be applied along with ground nut powder @ 250 g/tree. Rarely, if the vine growth is less, a small quantity of chemical fertilizer (Factamphos) will also be applied to basin to enhance vegetative growth. To avoid diseases of leaves and vines, bio control agents like pseudomonas will also be applied.

**c. Irrigation:**

Irrigation in summer will be provided either with the help of flexible pipe (Hose) or using traditional method. In traditional method a pit (*Ookuzhi or kole*) will be prepared between clusters. Water will reach the pit through *panappu*. From *Ookuzhi* pit, water will be applied to the basins (*thadam*) with the support of shallow metallic baskets called *thudippu*.

**d. Harvesting and packaging:**

In newly planted *Ottakkodi* harvesting starts 5-6 months after planting. Harvesting of the leaves will be done in the morning hours, once in 25-30 days. In *Ottakkodi* system, from one lateral branch 2 leaves will be harvested on a day. On one support 15-100 *Kannis* (lateral branches) will be there. So in one harvest approximately 40-200 leaves will be obtained and harvesting will be done once in



25-30 days. According to the growth of vine even 200 leaves/ support can be obtained in one harvest, especially in rainy season.

In *Koottakodi* system approximately 5-20 bundles (of 100 leaves each) will be obtained from one cluster making 350 bundles / cluster in 24 months of harvesting period. The leaves harvested in the first 4 months of harvest will be of best quality and afterwards the quality will get reduced and hence the price also.

The preparation of leaves for packing is an art and is known as *Chaykkal*. Farmers make bundles of folded leaves. If it is for Tirur market it will have 100 leaves. If it is for Kunnankulam market it will have 80 leaves (20x4) and for Kozhikode market it will be of 96 numbers ie 24x4 .Such bundles will be packed in fresh banana leaf and taken to traders. The traders repack these bundles. The exporters repack them in bamboo baskets lined with soaked paddy straw or paper with ice pieces to reduce drying of leaves during transportation. Generally petioles (leaf stalks) will be completely cut off, sometimes retaining 2 cm in length. This is done to avoid rotting of the leaves.

e. **Marketing:**

The first quality betel leaf will come to market during December, January and February. From March onwards the quality will get reduced and the supply will increase. The harvested leaves will be made to reach Tirur market on the same day evening by about 4pm. From there it will be repacked by traders to send to other markets either by road or by rail.

Tirur betel leaves are of great demand in markets within and outside the country. *Nadan* is mainly sold in local markets, (Thrissur, Kozhikode etc ) whereas *Puthukodi* goes to other states and countries. Maximum price is obtained for *Puthukodi*. The betel vine leaves are moving to other states *via* rail and to other countries by air cargo. The leaves are mainly exported to countries like Pakistan, Afghanistan and Bangladesh. In earlier days (1970's) from Tirur railway station every day a wagon of betel leaf (15-20 ton) was transported to other states. Now it has reduced to 10ton/day. From Tirur, betel leaves move to Delhi, Agra,



Mathura, Rampur, Meerut, Jodhpur, Gujarat etc. Sometimes betel leaf from Tirur will be transported to Chennai by rail and from there, it moves to Delhi to get distributed in local markets near to Delhi. By air, from Karippur the betel leaf will move to Doha or Qatar and from there it reaches to places like Lahore, Karachi etc. At Tirur there is a street known as '*Pan Bazar*' meaning *Vettila market* indicating the importance of betel leaf in the economy of Tirur market. Even now congregation of vettila traders are more in pan bazar.

**Price:**

Many people in Malappuram district derive their livelihood directly or indirectly, partly or fully from production, processing, handling, transportation and marketing of betel leaves. *Kootakkodi* system is more remunerative than *Ottakodi* system, even though cost of cultivation is more in this system. The yield is also more in *Kootakkodi* system. Raising one cluster may cost upto Rs. 3650/- Betel leaf is mainly cultivated by small and marginal farmers and also by landless laborers on leased land. The leaves are sold in domestic and international markets. Price obtained by *Tirur vettila* farmers in the gardens of cultivation is provided below. Total income from one cluster for 2 years comes to Rs.5260, making a net income of Rs. 1610 from one cluster.

**Economics:**

**Table 6. Item wise cost of cultivation of Tirur vettila (for one cluster for 2 years)**

Item	Expenditure (Rs.)
Planting of 1 cluster (8 plants) & cost of planting material	200
Inter cultural operations	100
Input cost (Manures, fertilizers, water, mulching etc.)	450
Cost of supports	400
Harvesting packing and transportation cost - Approx. (25 clusters will be harvested by one person on a day per cluster 26)	2500
<b>Total</b>	<b>3650</b>



**Table 7. Income from Puthukodi leaves (from one cluster for 2 years)**

Duration	Bundles/ month	Total bundles	Price (Rs.)	Income from Puthukodi (Rs.)
May – Oct. 1 <sup>st</sup> 6 months	Nil	Nil	-	-
Nov. – Jan. (1 <sup>st</sup> harvest)	6	18	45	810
Feb.-May	10	40	40	1600
2 <sup>nd</sup> yr June-Nov.	15	90	25	2250
Dec.-Jan.	20	40	15	600
<b>Total</b>				<b>5260</b>

**Table 8. Garden gate price of betel leaves in Tirur**

Sl. No.	Varieties	Price (Rs/bundle)
1	<i>Nadan</i>	20-35
3	<i>Puthukodi- 1<sup>st</sup> quality</i>	20-85
4	<i>Puthukodi- 2<sup>nd</sup> quality</i>	15-40

### **K. Uniqueness**

Betel leaf is often called as “Green Gold of India”. In Malayalam it is known as *Vettila*. Even though it is commonly used for making pan masala for chewing, it has many medicinal, industrial and cultural usages also. Due to its medicinal property it is used in *Ayurveda* system of medicine. Eugenol, isoeugenol and methyl isoeugenol are the chief ingredients of betel leaf oil and these impart medicinal, aromatic, stimulative and digestive properties to betel leaf. The essential oil contained in the leaves possess antibacterial and antifungal properties. Hence betel leaf has a promising industrial future as a raw material for manufacturing digestive agents, cosmetics, skin tonics, tooth pastes, perfumes, deodorants, soaps, antiseptic creams etc.

In Kerala, Malappuram district is well known for betel leaf cultivation. Tirur, Tanur, Tirurangadi, Kuttippuram, Malappuram and Vengara are the block



panchayaths famous for cultivation of Tirur betel vine. Betel leaf from Tirur is mainly exported to Pakistan and North Indian states. It is also sold in local markets in Thrissur, Malappuram and Calicut districts.

Popular cultivars of the area are *Puthukodi* and *Nadan*. Of the two major types *Puthukodi* is mainly cultivated as “*Koottakkodi*” as single crop for exporting to other countries and states whereas *Nadan* is cultivated as intercrop in coconut and arecanut gardens as *ottakkodi* for sale in local markets. The betel leaves from lateral branches of betel vine are locally known as ‘*Kannivettila*’ whereas leaves from main orthotropic stem are known as ‘*Pathivettila*’. *Kannivettila* from *Puthukodi* cultivar is used for export purpose whereas *pathivettila* of *puthukodi* and *kannivettila* from *Nadan* are sold in domestic markets in Tirur, Kozhikode and Kunnankulam.

Tirur betel leaf is more pungent than betel leaf produced in other areas. Its freshness is retained for a longer period due to leaf thickness. Moreover the optimum leaf characteristics provide more market value to this product. Organic method of cultivation is adopted to maintain the freshness and uniqueness of Tirur *Vettila*. Tirur *vettila* has more total chlorophyll and protein content in fresh leaves. *Nadan* has chlorophyll content of 2.54-2.56 mg/g whereas *Puthukodi* has 2.42-2.44 mg/g. The protein content is high in *Nadan* (3.76-3.79mg/g) and *Puthukodi* (3.21-3.25mg/g), than Muvattupuzha cultivar.

*Puthukodi* has high antioxidant capacity (7.41-7.58µg ascorbic acid/mg) followed by *Nadan* (7.01-7.05µg ascorbic acid/mg). Antioxidant capacity is contributed by several molecules like vitamin B1, B2 and E, as well as several phenolic compounds (Sytar, 2014). The antioxidant capacity is an important biochemical parameter contributing medicinal properties to betel leaf. Antioxidant capacity is contributed by several molecules like vitamin B1, B2 and E, as well as several phenolic compounds (Sytar, 2014). Antioxidant activity includes free radical scavenging capacity, inhibition of lipid peroxidation, metal ion chelating ability and reducing capacity. Free radicals play a vital role in



most major health problems like cancer, rheumatoid arthritis, cardiovascular diseases, Alzheimer's disease and other neurodegenerative disorders. Antioxidants scavenge these free radicals and proved to be beneficial for these disorders as they prevent damage against cell proteins, lipids and carbohydrates (Chakraborty and Shah, 2011). The antioxidant capacity is more in Tirur betel leaf. In Puthukodi it is 7.41- 7.58  $\mu\text{g}$  ascorbic acid/mg whereas in Nadan it is 7.05 – 7.05  $\mu\text{g}$  ascorbic acid/mg. The antioxidant property is less in other cultivar. In this context Tirur betel leaf has more medicinal properties than other local cultivar. This betel leaf had great potency to act as natural antioxidant and hence has anticancer properties. The consumption of antioxidant rich foods would help to neutralize the free radicals in the body, thus preventing or delaying the oxidative damage to lipids, proteins and nucleic acids.

Tirur betel leaf is more pungent than many other cultivars. Eugenol is the major essential oil in betel leaf adding to pungency. Tirur betel leaf have 15.22-16.34 % eugenol followed by methyl isoeugenol with a range of 0.08-0.32% and these contents contribute to the more pungency of Tirur betel leaf. High eugenol content gives better **antifungal and antioxidant properties to Tirur betel leaf**, compared to local cultivar. The isoeugenol content in Tirur betel leaf is 0.78-0.82%.

Eugenol had antifungal and antioxidant properties (Pradhan et al., 2013). Baliga et al., 2011, reported eugenol in betel vine as an excellent antimutagen. It could be used as a local anaesthetic for tooth ache (Pradhan et al., 2013). Eugenol with its antioxidant property makes Tirur betel leaf a probable candidate in health care. It is also used in perfumeries, flavorings and medicine as a local antiseptic and anesthetic. Methyl isoeugenol is a natural food flavor and is used for treating mood disorders (Fajemiroye et al., 2011). Hence, Tirur betel leaves have potential use in food flavours and medicines.

#### **Medicinal properties:**



Betel leaf is traditionally known to be useful for the treatment of various diseases like bad breath, boils and abscesses, conjunctivitis, constipation, headache, itches, mastitis, mastoiditis, leucorrhoea, otorrhoea, ringworm, swelling of gum, rheumatism, abrasion, cuts and injuries etc. From Tirur *vettila* is taken to *Kottakkal Aryavaidyasala* for use in Ayurvedic medicines. In traditional medicinal system it is used against fever, digestive problems and eye diseases. It is believed that chewing betel leaf is good for sound clarity and this property is valued by musical players. 'Susrutha' the ancient Ayurveda practitioner recommended betel leaf for enhancing the sweetness of sound. The high eugenol content, high protein content and high antioxidant property add to the medicinal value of this *vettila*. *Vettila* is a component of "Thampooladhi thylam" and is also used in preparation of indigenous medicines to treat cough. Chewing *thamboolam* after food enhances digestion.

#### **Cultural usage:**

Betel vine is used in temples for '*poojas*' and to give '*Dakshina*' during auspicious occasions. It is an integral part of *Thamboolam* and it is believed that the juice of betel leaf in *Thamboolam*, chewed after food enhances digestion. The famous traveller Marco Polo had described the habit of chewing *Thamboolam* by Indians. Abther Rassac (1442) the traveller from Arabia described about the method of preparation of '*Thamboolam*' in India.

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**Inspection body:**

Inspection body will be constituted with the following members.

1. President, *Tirur Vettila Ulpadaka Sangam*
2. Secretary, *Tirur Vettila Ulpadaka Sangam*
3. Director of Research, Kerala Agricultural University, Thrissur
4. Co-ordinator, IPR Cell, Kerala Agricultural University, Thrissur
5. Principal Agricultural Officer, Malappuram
6. Assistant Director of Agriculture, Tirur
7. Assistant Director of Agriculture, Tanur
8. Farmer representatives - 2



Along with the Statement of Case in Class 31 in respect of *Tirur Vettila* in the name of *Tirur Vettila Ulpadaka Sangam*, Tirur, Malappuram District whose address is

Tirur Vettila Ulpadaka Sangam  
Chembra, C/o Krishibhavan, Tirur  
Tirur-Chamaravattom Road,  
Alingal, 676108  
Malappuram Dist., Kerala.

who claim to represent the interest of the producers of the said good to which the geographical indications relates and which is in continuous use since time immemorial in respect of the said goods.

1. Other necessary particulars called for in rule 32(1) are given in the Statement of Case
2. All communications related to this application may be sent to the following address in India.

**Address** : The Coordinator,  
IPR Cell-KAU,  
Agricultural Research Station,  
Kerala Agricultural University,  
Mannuthy  
Thrissur-680 651, Kerala, India

**Email** : iprcell@kau.in

**Mob** : 9447878968

Signature

*Beera...*  
T.Y.  
32 സെക്രട്ടറി  
Secretary  
Tirur Vettila Ulpadaka Sangam  
Tirur





### CHARACTER OF LEAVES



Puthukodi



Nadan

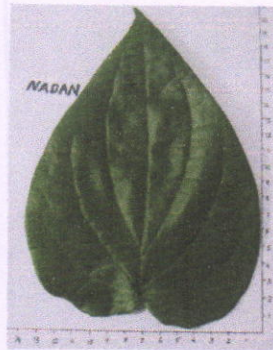


Muvattupuzha local

### Leaf Length and Breadth



Puthukodi



Nadan



Muvattupuzha local

### Leaf Tip Angle



Puthukodi (Narrow)



Nadan (Medium)



Muvattupuzha local  
(Medium)

### DOCUMENTATION





*Documentation*



**Koottakodi system of cultivation -planting and different stages**





## Koottakodi System



## Ottakodi planting and different stages



## Leaf harvesting





## Sorting, Packing and Marketing



## PPV&FRA Team Visiting Tirur betel leaf garden





GI APPLICATION No.

641

जारी करने वाली शाखा भारतीय स्टेट बैंक  
Issuing Branch: KERALA AGRICULTURE UNIVERSITY  
क्रॉड कोड / CODE No: 70670  
Tel No. 04870-237194

मांगपत्र  
DEMAND DRAFT

Key: SUJICIN  
Sr No: 428523

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OR ORDER

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Key: SUJICIN Sr. No: 428523  
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AUTHORISED SIGNATORY

शाखा प्रबंधक  
BRANCH MANAGER

₹ 1,50,000/- एवं अधिक के लिखत दो अधिकारियों द्वारा हस्ताक्षरित होने पर ही वैध है  
INSTRUMENTS FOR ₹ 1,50,000/- & ABOVE ARE NOT VALID UNLESS SIGNED BY TWO OFFICE

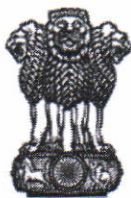
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सत्यमेव जयते

# Geographical indications Registry

Intellectual Property Building,  
G.S.T. Road, Guindy, Chennai - 600 032  
Phone: 044-22502091 & 92 Fax : 044-22502090  
E-mail: gir-ipo@nic.in



INTELLECTUAL  
PROPERTY INDIA

## Receipt

CBR NO :3576

Date : 20/12/2018

TO

Generated by  
:RATHIMEENA

THE COORDINATOR, IPR CELL-KAU,  
AGRICULTURAL RESEARCH STATION, KERALA AGRICULTURAL UNIVERSITY, MANNUTHY,  
THRISSUR,  
KERALA,  
680 651,  
INDIA

### C B R Details :

Application No	Form No	Class	No of Class	Name of GI	Goods Type	Amount Calculated
641	GI-1A	31	1	Tirur Betel Leaf (Tirur Vettilla)	Agriculture	5000

### Payment Details :

Payment Mode	Cheque/DD/PostalNO	Bank Name	Cheque/DD/Postal Date	Amount Calculated	Amount Paid
DD	313958	State Bank of India	24/10/2018	5000	5000

Total Calculated Amount in words : Rupees Five Thousand only

Total Received Amount in words : Rupees Five Thousand only

**\*\*\* This is electronically generated receipt, hence no signature required \*\*\***