Volume: 3 Issue: 11 Pages: 56-59


# Ethnomedicinal Practices of Chenchu Tribes in Nallamala Forest, Telangana, for Managing Menstrual Disorders

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**Article Info.**
**E-ISSN: 2583-6528**
**Impact Factor (SJIF): 6.876**
**Peer Reviewed Journal**
**Available online:**
**www.alladvancejournal.com**

**Received:** 21/Oct/2024
**Accepted:** 21/Nov/2024

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**Abstract**
The Nallamala forest, located south of the Krishna River in Telangana, is a rich biodiversity zone with 1,521 plant taxa, including 854 herbs, 190 shrubs, 281 trees, and 196 climbers. It supports traditional medicine practices of the Chenchu tribe, known for their expertise in treating menstrual disorders using plants. These remedies, derived from secondary metabolites like alkaloids, flavonoids, and tannins, are effective, non-toxic, and eco-friendly. This study highlights the forest's phytochemical potential through solvent extractions, FTIR, and UV analysis, emphasizing its significance in tribal healthcare and biodiversity conservation in the Deccan Peninsula.

**Keywords:** Traditional medicine, chenchu tribes, nallamala forest, menstrual cycle, phyto-chemical potential, secondary metabolites.

## Introduction

The Nallamala forest, part of the Eastern Ghats in India, spans 430 km and 7,640 sq. km, with elevations ranging from 2,900 to 3,600 feet. Its mixed deciduous vegetation is supported by red, black, and mixed soils. Among the flora, the most abundant families include Poaceae (178 taxa), Papilionaceae (116 taxa), Euphorbiaceae (83 taxa), Cyperaceae (79 taxa), Asteraceae (63 taxa), Acanthaceae (49 taxa), Rubiaceae (49 taxa), Malvaceae (44 taxa), Convolvulaceae (40 taxa), and Caesalpiniaceae (39 taxa). [4, 17]

Chenchu tribal are the major human population belongs to this range. The other tribes are Kondareddlu, Lambaadas, Yandudulu. The pioneers of chenchus prefer to living together in a group is known as Gudem and individual family living in a hut. The beginners of their tribe in the Nallamala were lived at Bhourapur, Appaipally, Appapur, Sarlapally, Dhararam, Earlapenta, Rampur, Medimulkala, Sangadigundala villages of Lingal mandal and Kudichinthalabailu, Kollampenta, Kommanpeta, Molakamamidi villages of Amrabad mandal.[17] These villages were located deep within the forest. Over time, they migrated to other areas within the forest.

Traditionally, Chenchu men wear a dhoti, and women wear a saree without a blouse. They have a strong affinity for ornaments made of shells and particularly favor ear tops crafted from alloys (panchaloha).

The Chenchu tribe's economy has historically relied on forest products such as honey, gums, tamarind, amla, wood apples, and more, as they were not familiar with agriculture. Hunting was their primary activity. However, in recent generations, they have learned agricultural practices and now cultivate crops such as maize, cotton, sorghum, capsicum, and various millet varieties. [15, 16]

The Chenchus hold strong spiritual beliefs and worship deities like Lingamaiah, Malalamma (Vana Devatha), Muthyalamma, and Ellamma. They have built temples for Lingamaiah, including the famous Saleshwaram temple, which is located deep within the forest. This temple is open to pilgrims only during Chaithra Pournami and remains closed for the rest of the year. The journey to the temple is considered adventurous and joyful. Menstrual Cycle is a periodical cycle that regularly takes place in reproductive women. If egg does not fertilized, then menstruation takes place which involves the breakdown of corpus luteum and decrease in hormones levels leading to shedding of uterine lining. This process is commonly referred to as a period. The cycle includes three phases-Follicle phase, Ovulation phase and Luteal phase, all

of which are regulated by hormones like GnSH, FSH, LH and estrogens. [18]

## Materials and Methods

Periodic field visits were conducted to the chenchu villages of Nagarkurnool District, in the Nallamala forest during the years 2015-2019. Meaningful interactions were held with the healers of Gudibanda, Chenchugudem, Bilakal, Ambagiri, SriRangapuram, Earlapenta, Macharam, Maddimadugu, Madonipally, Chitlamkuntla tribes of the forest.

The interviews were conducted in a structured manner, following Methodology for enumerating herbal treatment described by Jain and Goel.-1987. Sample medicines were collected from healers, and the constituent plants were gathered from the forest area.

Fresh plant parts were identified, authenticated and well labeled, prior to phyto-chemical analysis. The plant parts were separately cut into small pieces, and dried in shade for 15 days. They were then ground to powder and sieved before being subjected to phytochemical screening.

The present study aims to analyze the chemical components present in plant parts used in tribal medicine, specifically those found to have the potential to cure menstrual disorders.

Preliminary qualitative phyto-chemical screening was carried out for alkaloids, cardiac glycosides, flavonoids, phenols, tannins, steroids, anthraquinones, amino acids, monosaccharides, saponins by following the standard protocols [2, 5, 6, 10, 19, 21].

The Infrared spectroscopy was employed to study the functional groups and composition of the primary and secondary metabolites present in the prepared powder samples. Before spectral analysis, each powder sample was individually mixed with potassium bromide pellets. These samples were scanned under the Fourier transformed infra-red (FT-IR) spectrometer (Shimadzu IR Prestige_21 spectrophotometer) in the region of 4000-400 $cm^{-1}$.

The absorption spectra peaks revealed the presence of stretching bonds and various functional groups at distinct wave-number ranges.

For the preparation of ethanol extracts, 10 g of the aforementioned moisture-free powders were placed in 100 ml of ethanol. The extraction process involved either 72 hours of maceration or boiling for 5-6 hours. The mixture was then filtered through Whatman filter paper, condensed using a hot water bath, and subsequently used for UV spectral analysis.

## Result Analysis

**Table 1:** Constituents plants of the sample medicinal used by Chenchu tribe.

| S. No | Plant Name | Botanical name | Family | Plant part | Medicinal form |
|---|---|---|---|---|---|
| 1 | Tella galijeru | Ttrianthema portulacastrum | Aizoaceae | dried leaves | powder |
| 2 | Sri gandham | Santalum album | Santalaceae | dried stem | powder |
| 3 | Athimadhuram | Glycyrrhiza glabra | Fabaceae | dried stolon | powder |
| 4 | Ashoka | Saraca asoca | Caesalpinaceae | dried bark | powder |
| 5 | Shathavari | Asparagus racemosus | Asparagaceae | dried roots | powder |

### Traditional Medicine used for Menstrual Disorders i.e Sample and its Constituent Plants.

**1. Trianthema Portulacastrum L. Family: Aizoaceae**

**Vernacular Names:** Tella galijeru in Telugu. Varshabhu in Sanskrit. Horse purslane in English.

**Description:** A common prostate weed found in tropical and subtropical regions, characterized by a weak succulent stem that can grow up to 50 cm long. Its leaves are simple, petiolate, round to obovate, green, and measure 1-2 cm in length. The plant produces solitary, axillary flowers with petaloid perianths that are white in color. It is used in traditional medicine, particularly for treating amenorrhea. The root possesses antipyretic, analgesic, anti-inflammatory, and antifungal properties. [12]

**2. Santalum Album L. Family: Santalaceae.**

**Vernacular Names:** Chandanamu in Telugu. Srichandnam in Sanskrit. Indian sandal wood in English.

**Description:** An evergreen tree that grows up to 20 m in height. It is a partial root parasite until reaching a height of about 15-20 inches. The leaves are opposite, lanceolate, with an acute apex; dark green on the abaxial side and pale green on the adaxial side. The tree features a paniculate cyme inflorescence with reddish to purple-brown, actinomorphic, bisexual, and complete flowers. It is traditionally used to treat menorrhagia and is valued for its antifungal and antibacterial properties, making it beneficial for conditions like leucorrhea, urethritis, and vaginitis. [11]

**3. Glycyrrhiza Glabra L. Family: Fabaceae.**

**Vernacular Names:** Athimaduram in Telugu. Yastimadu in Sanskrit. Liquorice in English.

Greek- Glycyrrhiza- sweet root.

**Description:** A perennial shrub that grows up to 2 m in height, with horizontal rhizomes or stolons that can extend up to 6 m in length and are woody in nature. The leaves are pinnate, 15-20 cm long, and consist of 3-5 pairs along the rachis. The plant has a spike inflorescence with actinomorphic, bisexual flowers. The fruit is a pod containing reniform seeds. The drug is harvested from stolon four years after plantation, specifically during autumn. Stolons are carefully trimmed, washed, and sun-dried to remove moisture. It is known for purifying blood, treating bleeding disorders, and alleviating symptoms of premenstrual syndrome (PMS). [20]

**4. Saraca Asoca (Roxb.) Wild Family: Caesalpiniaceae.**

**Vernacular Names:** Sita Asoka in Telugu. Asoka in Sanskrit. Ashok tree in English.

It is a Sanskrit word, name that indicates no sorrows.

**Description:** An evergreen mesophyte with beautiful and fragrant flowers. It has an aerial, erect stem that can reach up to 10 m in height, covered with dark green to brown bark. The leaves are pinnately compound, with green, lanceolate leaflets featuring acute apices. The plant produces racemose inflorescences with yellowish-orange flowers. The corolla is absent, and the calyx is petaloid.

The fruit is a leathery or woody pod. A decoction prepared from bark powder is beneficial for treating bleeding disorders, heavy menstrual periods, and menstrual pain. [14]

**5. Asparagus racemosus Willd. FAMILY: Asparagaceae.**

**Vernacular Names:** Pilli-theega, pilli-pithara in Telugu. Shathamuli, Shathavari in Sanskrit. Buttermilk root, wild asparagus.

**Description:** A pine-like plant with phylloclades modified for photosynthesis and hooked spines. It has adventitious tuberous roots and is leafless, with branches serving as phylloclades. The plant grows to a height of about 2 m and produces blackish-purple berries as fruits.

**Uses:** It supports women's health, particularly the genital system, alleviates abdominal pain, balances hormonal activity, and regulates ovulation. [1]

Phytochemicals analysis showed the presence of various compounds in the following extracts.

**Table 2:** Phytochemical analysis of traditional medicine (sample) extracts from various solvents.

| Phytochemical Constituents | Distilled Water | Methanol | Chloroform | Petroleum Ether | Ethyl alcohol | Ethyl Acetate |
|---|---|---|---|---|---|---|
| Alkaloids | + | + | + | - | + | + |
| Cardiac glycosides | + | + | + | - | + | - |
| Flavonoids | + | + | + | + | + | + |
| Phenols | + | + | + | + | + | + |
| Tannins | + | + | + | + | + | - |
| Steroids | - | - | ++ | - | - | - |
| Anthro quinines | + | + | - | - | - | + |
| Amino acids | - | + | + | - | + | - |
| Monosaccharides | + | + | + | + | + | + |
| Saponins | + | - | - | - | - | - |

- = indicates absence of phytochemicals.
+ = indicates presence of phytochemicals and
++ = shows moderate concentration.

**FTIR Analysis**

The FTIR spectral analysis of Sample and its Constituent plants reveals the presence of various kinds of functional groups in the form of following Stretching's at the following Wave numbers (cm-1).

The absorption peaks at 3784 in Sample, 3787 in Glycyrrhiza glabra, and 3786 in Saraca asoca are indicating the presence of Carbon with halide stretching. The absorption peaks at 3407 in Sample, 3407 in Saraca asoca, 3439 in Asparagus racemosus indicating the presence of C-OH stretching. The absorption peaks at 3337 in Sample, 3349 in Santalum album, 3354 in Glycyrrhiza glabra indicating the presence of N-H stretching. The absorption peaks 2922 in Sample, 2927 in Santalum album, 2924 in Glycyrrhiza glabra, 2947 in Asparagus racemosus are indicating the presence of alkyl stretching. The absorption peaks at 2855 in Sample, 2853 in Trianthema portulacastrum, and 2854 in Saraca asoca are indicating that presence of C-H stretching. The absorption peaks at 1740 in Sample, 1741 in Trianthema portulacastrum, 1741 in Glycyrrhiza glabra, and 1741 in Asparagus racemosus indicating the presence of C=O stretching indicating the presence of aldehyde functional group. The absorption peaks at 1627 in Sample, 1635 in Trianthema portulacastrum, 1647 in Santalum album, 1626 in Glycyrrhiza glabra, 1613 in Saraca asoca, 1631 in Asparagus racemosus indicating the presence of C=C stretching. The absorption peaks at 1369 in Sample, 1320 in Santalum album, 1369 in Glycyrrhiza glabra, and 1369 in Asparagus racemosus indicating the presence of N-C bonding indicating the presence of amine group. The absorption peaks at 1028 in Sample-2, 1024 in Trianthema portulacastrum, 1032 in Santalum album, 1028 in Glycyrrhiza glabra, 1030 in Saraca asoca, and 1025 in Asparagus racemosus indicating the presence of anhydride functional group.

**UV Analysis**

This UV absorption spectral peaks indicates, 1) from 300 nm to 500 nm, $\pi - \pi^*$ bonding, 2)500 nm to700nm, N $-\pi^*$bonding.

$\pi - \pi^*$ stretching in Sample at 395 nm, 362 nm, 349 nm, in Trianthema portulacastrum at 423 nm, 400 nm, 358 nm, in Santalum album at 373 nm, 349 nm, 303 nm, in Glycyrrhiza glabra at 415 nm, 401 nm, 347 nm, in Saraca asoca at 428 nm, 355 nm, and in Asparagus racemosus at 341 nm. N $-\pi^*$ in Sample at 658 nm, in Trianthema portulacastrum at 665 nm, 608 nm, 535 nm, in Saraca asoca at 532 nm, and in Asparagus racemosus at 659 nm.

**Table 3:** FTIR Absorption frequencies of Samples and their constituent plants.

| Plant material | C-X | C-OH | N-H | Alkyl | C-H | C=O | C=C | N-O | CHO |
|---|---|---|---|---|---|---|---|---|---|
| Trianthema portulacastrum | - | - | - | - | 2853 | 1741 | 1635 | - | 1024 |
| Santalum album | - | - | 3349 | 2927 | - | - | 1647 | 1320 | 1032 |
| Glycyrrhiza glabra | 3787 | - | 3354 | 2924 | - | 1741 | 1626 | 1369 | 1028 |
| Saraca asoca | 3786 | 3407 | - | - | 2854 | - | 1613 | - | 1030 |
| Asparagus racemosus | - | 3439 | - | 2947 | - | 1741 | 1631 | 1369 | 1025 |
| Sample | 3784 | 3407 | 3337 | 2922 | 2855 | 1740 | 1627 | 1369 | 1028 |

**Table 4:** UV spectral analysis of Sample and its constituent plants.

| Stretching/Peaks | Trianthema Portulacastrum | Santalum Album | Glycyrrhiza Glabra | Saraca Asoca | Asparagus Racemosus | Sample |
|---|---|---|---|---|---|---|
| π –π * | 423 | 373 | 415 | 428 | 341 | 395 |
| | 400 | 349 | 401 | 355 | - | 362 |
| | 358 | 303 | 347 | - | - | 349 |
| N –π * | 665 | - | - | 532 | 659 | 658 |
| | 608 | - | - | - | - | - |
| | 535 | - | - | - | - | - |

## Discussion and Conclusion

The practice of traditional medicine is considered to be more effective in regulating the disorders of menstrual cycle in reproductive woman and they are lesser in toxic and free from side effects. The sample medicine given by healers consisting of Trianthema portulacastrum dried leaves, Santalum album dried stem, Glycyrrhiza glabra dried stolon, Saraca asoca dried bark, and Asparagus recemosus dried roots. For the chemical analysis, plant extracts were prepared by following the standard protocols. These extracts when tested with various reagents revealed the presence of various active principles in constituent plant parts, those act against Menstrual disorders. Further FTIR, and UV spectral analysis strengthen the investigation of active principles in the crude drug. The analysis of FTIR spectra, peaks in the graphs indicates C=O, C=C, C-H, C-N bonding at distinct wavelengths in the powder forms of the Constituent plants. In the UV spectral analysis the transmittance peaks indicated C=C, C-N/ C=O bonds at distinct wave numbers in the ethanol extracted powder forms. All these investigations indicates the presence of various type of Alkaloids, Glycosides, Saponins, Phenolic compounds, Tannins, Amino acids, Steroids, and Anthraquinones which are very active to regulate menstrual disorders and stabilizes the hormonal imbalance.

## Aknowledgements

1. I am very much grateful to all the CHENCHU HEALERS, Amrabad area of Nallamala forest for providing the data and Sample medicine.
2. I am very much thankful to the Director, CFRD, OU for the results of FTIR and UV spectral analysis.

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