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REVIEW ARTICLE ON GYMNOSTACHYUM FEBRIFUGUM BENTH

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ABSTRACT

Introduction: There is a focus on herbal drugs based on traditional system of medicine and remedy based on folk knowledge due to their easy access, low cost and faith of people. Other than *Samhitas* and *Nighantus* there are innumerable drugs which are used by folklore practitioner in treating many diseases. *Gymnostachyum febrifugum* Benth. commonly known as Chitekegida in Kannada is a small perennial herb, the root and aerial parts of which are used in fever in the form of decoction. It is commonly available herb with potent active principle belonging to family *Acanthaceae*, grows in moist places, paddy fields, slopes etc. Folklore practitioners of coastal area use this plant for the treatment of fever, cough. **Methodology:** The literary information regarding drug collected from the contemporary texts, folklore practitioners, forest dwellers, e-sources and traditional claims. **Result an d Conclusion:** Though references of this herb are not mentioned in classical texts of Ayurveda, but folkhealers are successfully treating some of diseases using different part of *G. febrifugum* Benth. It is need of an hour to explore these extra pharmacopeial drugs with latest research updates and incorporate this knowledge into treatment modality of Ayurveda.

INTRODUCTION

Herbal drugs play a major role in supporting life of the other organisms. A large population in the world depends on plants for health improvement and to cure diseases. Even during Vedic period 289 plants were describe, in *Brihatrayees* around 1900 plants have been mentioned. Further *Nighantukaras* (Lexicons) added around 400 new medicinal plants in ayurvedic Materia medica.[1] This showcases the deep understanding of plants and their medicinal properties in Ayurveda. There are innumerable plant species which were not

recorded in Classical treatise though they have the medicinal properties. Such undocumented drugs are known as Anukta dravya. Folk healers successfully treating majority of diseases using local flora with their medicinal knowledge which are not documented. These *Dravyas* are to be studied for their morphology and to give literary validation of identification on the lines of Ayurvedic philosophic for conversion and utilization. Ethnopharmacological studies provide a crucial role in the development of novel drugs. Many well-known therapeutic formulations are derived directly or indirectly from plants, one such ethnomedicinal plant is *Gymnostachyum febrifugum* Benth. which is endemic to Western Ghats**.** It is a scapigerous[2] herb with reduced stem distributed in tropical Asia.

MATERIAL AND METHOD

Source of data: The information and medicinal use of the drug was collected from folklore practitioner, forest dwellers, book of flora, relevant textbooks, various publications, and journals.

Results: The drug ***Gymnostachyum febrifugum* Benth.** is not mentioned in Vedas, Samhitas, Nighantus and other literature of Ayurveda. Even newly coined Sanskrit name is also not given till now.

Table 1: The vernacular name.[3]

Language	Name
Kannada	Nelamuchala, Bili agrada beru, Jwawahara soppu, Narumbeli soppu
Malayalam	Nilamuchchala, Naavuneetti
Tamil	Nela muchchala
Tulu	Chitike
English	Fever gymnostachyum

Botanical information: *Gymnostachyum febrifugum* Benth.

Synonyms: *Cryptophragmium febrifugum* Kuntze, belonging to family Acanthaceae.[3]

Table 2: The taxonomical position.[4]

Kingdom	Plantae
Division	Spermatophyta
Sub Division	Angiospermae
Class	Dicotyledonae
Sub Class	Gamopetalae
Order	Personalis
Family	Acanthaceae

Genus	Gymnostachyum
Species	Febrifugum
Synonym	*Cryptophragmium febrifugum* Kuntze

Family characters[5]: Acanthaceae: The family is known for its ornamental and tropical member generally consist of soft wooded herbs, undershrubs, or shrubs and are very beautiful. The leaves are simple, opposite, and exstipulate means they lack stiplules and arranged in pairs along the stem. Inflorescence can take the form of a spike, cyme or sometimes a raceme. Additionally, in certain species, the flowers are found in axillary clusters meaning they are arranged in clusters in the leaf axils which are the angles between the upper side of the leaf and the stem. Flowers exhibit zygomorphism, which means bilaterally symmetrical. The corolla is often bilabiate or oblique. These flowers are also bisexual and hypogynous. They often have conspicuous bracts and bracteoles. Calyx composed of 4- 5 united sepals. Corolla consists of 5 petals, with liped or oblique corolla, and imbricate arrangement in the bud. Ovary is syncarpous with 2 cells. Ovules ranging from 2 to many in each cell, with axile placentation. Fruit is a 2- valved capsule with seeds supported on curved hooks.

Genus character[6]: *Gymnostachyum***:** The genera *Gymnostachyum* exhibit a growth habit of being herbs or undershrubs often with soft or woody stems. The leaf arrangement is either cauline where leaves are attached directly to the stem or subradical forming a basal rosette. Flowers are arranged binate or in axillary or terminal paniculate cymes or spikes; bracts and bracteoles very small. The calyx 5-partite, divided into 5 lobes and these lobes are linear-lanceolate. The corolla tube long, cylindric, usually curved and widened above its curved portion; limb 2-lipped; upper lip emarginate or 2-lobed and lower lip short. 2 stamens, included or slightly exserted; staminodes are absent; anther-cells are 2 and parallel. Ovary 2-celled with each containing 6-many-ovules. Capsules are linear in shape. Seeds are ovoid or orbicular, compressed.

Table 3: Species: Some of the species which are identified.[7]

S. No.	Name of the species
1	*G. venustum*
2	*G.febrifugum*
3	*G. ceylanicum*
4	*G. thwaitesii*
5	*G. polyanthum*
6	*G. peniculatum*
7	*G. glabrum*

8	*G. leptostachyum*
9	*G. canescens*
10	*G. latifolium*
11	*G. sanguinolentum*
12	*G.tomentosum*
13	*G.hirsutum*

Species character[8]: The key for identification of *G. febrifugum* species is having highly reduced stem with ovate dark green color leaves with shining adaxial side and lighter abaxial side along with winged petiole about 5 to 18 cm long. Its beautiful light pink to purplish flowers featuring yellow lower lip adds to the plant's overall appeal.

Fig. 1: Whole plant of *Gymnostachyum febrifugum* Benth.

Fig. 2: Leaves of *G febrifugum* Benth.

Fig. 3: Flower of *G febrifugum* Benth.

Habitat and Distribution[9]: *Gymnostachyum febrifugum* Benth is found in the Southern Western Ghats region. It is found in Dakshina Kannada and Udupi districts. It is also found in regions of Madras, W. coast, South Canara, Malabar and Travancore.

Habit/ Morphology[6]: *G. febrifugum* Benth. is small, nearly stemless herb. Leaves are subradical, up to 15 x 7.5 cm. ovate, undulate-crenulate, rounded at base and long-decurrent

on the petiole. Panicle terminal, 15-30 cm long; flowers opposite, solitary or in few-flowered cymes. Corolla 2.5- 3.5 cm long, pale greenish yellow or purplish. Capsules 2.5 cm long.

Phenology[10]: It flowers between October to January. The germination period for this species occurs within 20-30 days. The maturity period indicating when the plant reaches full maturity, is 4- 6 months. Understanding the phenology of a plant species is crucial for its cultivation, conservation and ecological interactions.

Chemical composition: It contains bitter principle of a Resinoid in nature, along with Cholesterol a type of sterol and small amount of Tannin and Sugar.[2] The phytochemical analysis of the root shows presence of carbohydrates, flavonoids, phenols and steroids[11] .These component contribute to the medicinal properties or flavor of the plant.

Folklore/Indigenous medicinal uses: The plant holds significance in indigenous medicinal practices, as per the Ethno- medico- botanical surveys. It involves oral application of mixture of root and lime juice over the tongue to alleviate blisters and sores.[2] And also the decoction made from the root is considered effective in treating fever.[12] The leaves of the plant are used for addressing conditions such as gonorrhea and ear diseases.[13] The roots are utilized for treating cough, headaches, ulcers, indigestion and menorrhagia.[11] These all indicates the plant's traditional role in providing remedies for specific health issues.

Pharmacological activity: The decoction of the plant was efficacious to reduce pyrexia in albino rats.[14] The strong antioxidant activity demonstrated by the plant extracts against various in vitro oxidative system suggest valuable potential application and may be considered for use as a nutrient additive or as a source of natural antioxidants.[15] The plant extract also shows potential antimicrobial activity.[15] This implies a possible role in treating infectious diseases caused by microorganism that have developed resistance to commonly used medication. Also the ethanolic extract of the whole plant was found to possess good hepatoprotective property.[16]

Conservation concern details: The conservation status of *G. febrifugum* Benth has not been yet evaluated.[17]

Cultivation and Propagation: The cultivation of the plant can been carried out through seed germination or by using suckers.[10] It is mentioned that vegetative propogation is limited due to highly condensed stem. This indicate that while seed germination and use of suckers are

viable method for propagation but the condensed nature of the stem may pose challenges for vegetative propagation methods that rely on other part of the plant.[8]

Horticulture importance: The formation of a rosette with shiny green leaves enhances the plant's aesthetic appeal. The presence of attractive pink flowers with yellow lip further adds to its ornamental value. The arrangement of flowers in erect terminal racemes provides an appealing visual display. The plant ability to tolerate partial shade makes it versatile for both indoor and outdoor settings. The plant's resistance to in insects and pests contributes its acceptance in gardens. Its adaptability makes it ideal for uses as an "edge" plant, along footpaths, or in mixed beds, contributing to landscape aesthetics.[8]

DISCUSSION

Ayurveda, Indian system of medicine considers all the *Dravyas* existing in this world work as medicine when used rationally.[17] It recognizes the medicinal potential in every substance and encourages the compilation of medicinal uses based on observations from nature and the knowledge of local communities such as shepherds and cowherds. The tribal communities use locally available plant resources for daily needs and various medicinal purposes. It underlines the importance of understanding and preserving traditional knowledge for the sustainable utilization of natural resources. *Anukta dravya* means all those plants which are not mentioned in Ayurvedic classical literature, Classical Nighantus and Ayurvedic pharmacopeia of India. While Ayurveda is written documentation, folklore practices are transmitted through generations and passing down valuable knowledge from ancestors. The documentation of medicinally important plant species in the study reflects an effort to capture and preserve the rich knowledge held by folklore practitioners. These *Dravyas* are to be studied and documented for their morphology and to give literary validation of identification on the lines of Ayurvedic philosophy for conversion, utilization, and accessibility of this valuable knowledge for both present and future generations. *Gymnostachyum febrifugum* Benth. small perennial herb from *Acanthaceae* family which has traditional uses like oral application for blisters and sores on the tongue, decoction in fever, application of leaves in gonorrhea and ear diseases and the utilization of roots in cough and menorrhagia. These uses demonstrate the plant's importance with indigenous communities for maintaining health and treating specific ailments.

CONCLUSION

Many plant species with medicinal properties have been documented and incorporated into pharmacopeias, there are still many others that have not undergone formal documentation or validation. These undocumented plants are often referred to as extra pharmacopeial drugs and are used by folklore practitioners. Further these extra pharmacopeial drugs may complement conventional medicine, offering alternative treatment options, along with role in conservation strategies. Hence, *Gymnostachyum febrifugum* Benth. which is one of the extra pharmacopeial drugs used by many folklore practitioners in many clinical conditions. Such drugs are to be validated and documented for further researches.

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