

## Phytotherapy Practices of *Asclepidaceae* Members in Chitradurga District, Karnataka State: An Approach Towards Biochemical/Biopharmaceutical Research

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### Abstract

India has one of world's richest medicinal plant heritages. The wealth is not only in terms of the number of unique species documented, but also in terms of the tremendous depth of traditional knowledge for the use of human & livestock health and also for agriculture. The medicinal plant species are used by various ethnic communalities for human and veterinary health care, across the various ecosystems in India. Chitradurga district of Karnataka state at its extreme limits is situated between longitudinal parallels of 76° 01' and 77° 01' east of Greenwich and latitudinal parallels of 13° 34' and 15° 02' north of equator in the leeward side of the Western Ghats. The topographical and climate diversity of the region has resulted in dry deciduous to thorn scrub forest. The plant diversity of the region is facing a severe depletion due to the continuous loss of forest land, uncontrolled grazing, forest fire, landslides and anthropogenic activities. The medicinal properties shown by different plants are due to the phytochemicals present in them which are the most vital sources for the treatment of destructive diseases by enhancing the immune system by producing specific physiological action on the human body. Flavonoids, tannin, phenolic compounds and alkaloids are the most important bioactive components of plants. At this juncture, conservation and protection of ethno medicinal plants of the region needs top priority. The present investigation is an attempt to survey of *Asclepidaceae* members for their ethno-medicinal uses to cure various ailments by the ethnic groups which may leads to the discovery of biochemical/biopharmaceutical compounds.

The local health healers/tribes are routine use of 08 medicinal plants belonging to *Asclepidaceae* for the treatment of diseases, which includes Snake bite, Diabetes mellitus, Asthma, Cough, Urinary infection, Jaundice, Piles, Rheumatism and Veneral diseases. The study reveals that leaves and roots were most frequently used (07 sps), followed by stem (02 sps), Latex (02 sps), fruits/seeds, bark and flowers one species each. The plant species used in the treatment are *Calotropis procera*, *Hemidesmus indicus*, *Gymnema sylvestre*, *Leptodenia reticulate*, *Tylophora asthmatica*, *Sarcostemma secamone*, *Wattakaka volubilis*, and *Pergularia daemia*. The study showed that many people of Chitradurga district still depend traditionally on medicinal plants for primary health care. Therefore, the present study is an attempt to explore ethno-medicinal plants of *Asclepidaceae* in the said region.

**Keywords:** Ethnomedicine; Asclepidaceae; Chitradurga; Traditional healers; Tribes

### Introduction

Ethno botanical knowledge is very ancient. It provides information regarding traditional uses of plant wealth which can be utilized in integrated tribal development. The ethno botanical studies throw light on certain unknown useful plants and new uses of many known plants which can be exploited for developing new sources for some plants products and agro based industries such as food processing, fibers, and floss, cordage and basketry, extraction of edible and non-edible oils, gums, resins, tannin, dye extraction for the upliftment of tribal communities. The tribal's depend mostly on forest flora for meeting their day to day needs and primary health care. They collect and utilize many wild plants for food, medicines, fibers, oils, gums, tannins and dyes from the ambient vegetation of their localities. They utilize medical plants for the treatment of diseases and disorders like diarrhea, dysentery, fever, headache, skin diseases, boils and blisters, rheumatism and gout, piles, jaundice, eye diseases, toothache, bone fracture, snakebite, worm infection, cuts and wounds, cough, cold, asthma, leprosy etc. The ethno medicinal data will serve as a useful source of information for the chemists, pharmacologists and practitioners of herbal medicines for the detection and isolation of bio active compounds used in medicines.

Phytochemicals are the chemicals that present naturally in plants. Now-a-days these phytochemicals become more popular

due to their countless medicinal uses. Phytochemicals play a vital role against number of diseases such as asthma, arthritis, cancer etc. unlike pharmaceutical chemicals these phytochemicals do not have any side effects. Since the phytochemicals cure diseases without causing any harm to human beings these can also be considered as "manfriendly medicines". Phytochemicals are beneficial to boost up immunolatory responses and also provide immunity against many diseases. Some phytochemicals are known to reveal medicinal and physiological activities which are phenols, tannins, flavonoids, saponins, carbohydrates, alkaloids, phytosterols etc. [1-3]. Therapeutic or curing activities of plants were conventionally proclaimed to have

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medicinal properties by small researchers. In worldwide medicinal plants the presence of phytochemicals checked in recent researches. Anti-inflammatory and anti-nociceptive activities of *Calotropis procera*, are the significant properties of conventional medicinal plants against many pathogens. So because of the presence of bioactive constituents medicinal plants show these medicinal properties [4-7]. Since time immemorial, people in Chitradurga have been using medicinal plant to tackle different livestock and human diseases. Many antioxidant compounds can be found in fruits and vegetables including phenolics, carotenoids, anthocyanins, and tocopherols [1]. Approximately 20% of known plants have been used in pharmaceutical studies, impacting the healthcare system in positive ways such as treating cancer and harmful diseases [2]. Plants are able to produce a large number of diverse bioactive compounds. High concentrations of phytochemicals, which may protect against free radical damage, accumulate in fruits and vegetables [3]. Plants containing beneficial phytochemicals may supplement the needs of the human body by acting as natural antioxidants [4]. Various studies have shown that many plants are rich source of antioxidants. For instance, vitamins A, C, E, and phenolic compounds such as flavonoids, tannins, and lignins, found in plants, all act as antioxidants [3]. The consumption of fruits and vegetables has been linked with several health benefits, a result of medicinal properties and high nutritional value [5]. Antioxidants control and reduce the oxidative damage in foods by delaying or inhibiting oxidation ultimately increasing the shelf-life and quality of these foods [6]. Beta carotene, ascorbic acid, and many phenolics play dynamic roles in delaying aging, reducing inflammation, and preventing certain cancers [7].

The present study was intended to study the therapeutic plant science in the conservation of these fast depleting medicinal plant resources which inturn focus on Biochemical and biopharmaceutical field.

## Materials and Methods

### Study area

Chitradurga forest division occupies almost a central position in the eastern plains of Karnataka and leeward side of the Western Ghats the district at its extreme limits is situated between longitudinal parallels of 76°01 and 77°01 east of Green witch and latitudinal parallels of 13°34 and 15°2 north of equator. The general elevation of the district is between 500 m to 600 m above sea level. The geographical area of the district is 8,440 Sq.kms, which accounts for 4.37% of the state’s geographical area. An ethno botanical survey was carried out in 10 villages viz., Kurudihally, Parashurampura, Nayakanahatti, Gowripura, Upparahatty, Kaluvehally, Giddapura, Gowdarahatty, etc (Figure 1).

Ethno botanical data was collected through field visits, questionnaire, interview and personal interactions (Tables 1 and 2).

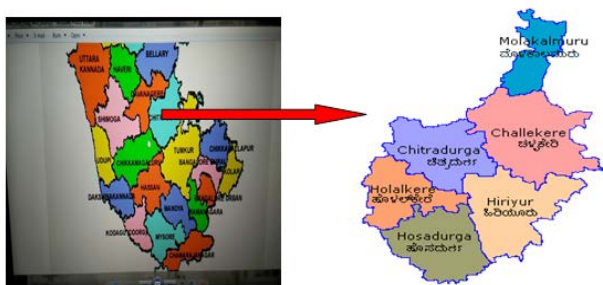


Figure 1: Karnataka state, Chitradurga district.

Table 1: Local health healers.

Sl. No.	Name	Age	Village
01	Gopal reddy	56	Kurudihally
02	Budha deva	55	Parushurampura
03	Pandit Basha Sab	74	Nayakanahatty
04	Sanna thimmakka	76	Gowripura
05	Imam sab	62	Kurudihally
06	Lakshmana	38	Challakere
07	Bangarappa	37	Upparatty
08	Govindajja	80	Kaluvehally
09	Nagendrappa	48	Giddapura
10	Palayya	70	Gowdarahatty

The local health healers were requested to show the plants in wild condition .These traditional health healers includes tribal’s group like Hakki-Pikki, Kuruba, Jenukuruba, Gollas and folk healers are the communities who are intimately associated with the local forests and who treat all kinds of common diseases. Local names, plant part used as medicine, mode of formulations, and method of administration were collected .Identification of plants was confirmed with the help of flora of madras and flora of Karnataka (Figure 2).



Figure 2: Local health healers using *Asclepiadaceae* members to treat diseases.

### Plant species used in phytotherapy

(Figures 3-11)

## Results and Discussion

The present study comprises ethno-botanical usage of 08 species belongs to *asclepiadaceae* family viz. *Calotropis procera*, *Hemidesmus indicus*, *Gymnema sylvestre*, *Leptadenia reticulata*, *Tylophora aathamatica*, *Sarcostemma secamone*, *Watakaka volubilis* and *Pergularia deamia*. Among the plants used, includes herbs (03 species), Shrubs includes (02 species) while the climbers include (03 species) (Table 3) (Figure 12).

Among the plant part used Root and Leaves is of routine use with the highest percentage 33. It is followed by latex with the percentage 10, stem with the percentage 9, flower, bark and fruits/seeds accounts for 05% respectively.

**Table 2:** Plant name, local name, part used and disease for which it is used.

Botanical name	Local name	Part used	Disease
<i>Calotropis procera</i>	Ekka	Root, leaf, latex	Piles, cough, rheumatism.
<i>Tylophora asthamatica</i>	Aadu muttada Balli	Leaves and roots	Asthma, snake bite, dysentery.
<i>Watakaka volubilis</i>	Meese Kayi Gida	Roots, leaves latex	Boils & abscesses, piles, jaundice.
<i>Pergularia deamia</i>	Kuntike Gida	Roots, stem, leaves & bark	Diarrhea, scabies, snake bite, whooping cough.
<i>Leptadeania reticulata</i>	Haale Balli	Root, stem, leaves	General weakness, night blindness.
<i>Gymnema sylvestre</i>	Madhunashini	Leaves, seed, flower	Diabetes mellitus, asthma, cough
<i>Hemidesmus indicus</i>	Sogade Beru	Roots	Anaemia, Urinary infections, Veneral diseases.
<i>Sarcostemma secamone</i>	Somavali	Roots, leaves	Jaundice, throat & mouth infection, gonorrhea



Figure 3: *Calotropis procera*



Figure 7: *Tylophora asthamatica*



Figure 4: *Hemidesmus indicus*



Figure 8: *Sarcostemma*



Figure 5: *Gymnema sylvestris*



Figure 9: *Watakaka volubilis*



Figure 6: *Leptadenia*



Figure 10: *Pergularia daemia*.



Figure 11: Chitradurga forests.

Table 3: Plant parts used in formulation of diseases.

SI No.	Part used	No. of uses	Percentage
01.	Leaf	07	33%
02.	Root	07	33%
03.	Fruits/seeds	01	05%
04.	Bark	01	05%
05.	Stem/Rhizome	02	09%
06.	Flower	01	05%
07.	Latex	02	10%

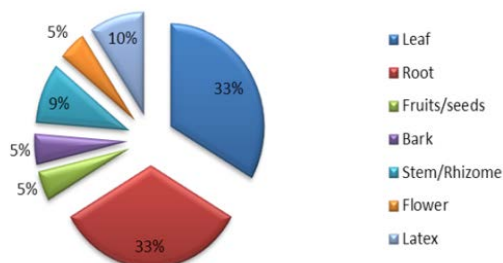


Figure 12: Plant part wise used in ethnomedicine.

## Conclusion

It is apparent that the Chitradurga district is rich in ethno medicinal knowledge and this knowledge is transferred from generation to generation. Most of the medicinal plant species are threatened with extinction due to unsustainable harvesting. Some important medicinal plants needs immediate conservation and their cultivation should be encouraged through which their extinction can be prevented and local village people may also get low-cost cure and treatment of livestock diseases. Hence there is an urgent need to assess the biodiversity of the local forest, the medicinal plants and their associated traditional knowledge by proper documentation and conservation strategies. In this context plant tissue culture play important role in conserving these medicinal plant wealth because of many scientific, economic and ecological advantages. It is nowadays considered as important strategy for *in vitro* production of bioactive compounds for drug industries.

It can be concluded that the source of secondary metabolites like flavonoids, carbohydrates, glycosides, alkaloids, phenols and phytosterols are present in the selected medicinal plants which are used in Chitradurga. Because of the presence of these secondary metabolites the selected medicinal plants have high healing potential. These phytochemicals render the medicinal values of the studied plants.

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