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A Review on Ethnobotanical uses of *Smilax ovalifolia*

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Abstract
Medicinal plants are used by various tribes for treating various kinds of diseases since time immemorial. These traditional medicinal systems play a key role in healthcare system of rural people. *Smilax ovalifolia* belongs to the family Smilacaceae. It is distributed in the forest area of the Central and Eastern parts of China, India, Myanmar, Nepal, Thailand and Vietnam and nearby regions. The present paper is a review on ethnomedicinal uses of *Smilax ovalifolia*, which is widely used by different tribes and medicinal practitioners for treating of various diseases. Different parts of the plant (roots, leaves and tender shoots) are variably used in treating wide range of diseases like jaundice, skin problems, toothache, urinary complain, muscular sprain, stomach pain, rheumatic arthritis, venereal diseases, infertility, as sexual stimulant, in abnormal semen discharge, uterine diseases, sores, dysentery, malaria, tuberculosis, leucorrhoea, wound healing, to increase appetite, different types of gastric disorders and also used as antibiotic, antifungal, antiseptic and blood purifier. The plant is also used as vegetable by some groups. After the study it can be concluded that the plant can considered as a suitable source for new drug development and synthesis.

Keywords: *Smilax ovalifolia*, Ethnobotany, Tribes and Diseases.

1. Introduction
Medicinal plants include different types of plants used in herbalism and some of these plants have medicinal activities. These are considered as a potent source for drug development and synthesis [1]. The term Ethnobotany is defined as "the study of the relationship which exists between people of primitive societies and their plant environment" [2]. The traditional methods of medicine, especially by using medicinal plants, still play a vital role to cover the basic health needs in the developing countries [3]. These traditional medicinal systems play a key role in healthcare system of rural people and various tribes are using the medicinal plants for treating various kinds of diseases since time immemorial [4]. Even the same plants are used by different tribes in different diseases in different ways. According to the World Health Organization (WHO) near about 65% population of the world rely on ethnomedicinal plants to meet their primary health care needs [5].

1.1. Plant Description
Smilax ovalifolia belongs to the family Smilacaceae. It is distributed in the forest area of the Central and Eastern parts of China, India, Myanmar, Nepal, Thailand and Vietnam and nearby regions [6]. It is an armed or unarmed climber. The leaves are leathery, shining, about 7-15 x 4-11 cm, broadly ovate to elliptic having rounded base or shortly wedge-shaped; 3-5-nerved.The stalk of leaf is 1.5 cm long, base sheathing, with tendrils at the end. Flowers white, in dense umbels in leaf axils, 1-3 on a common peduncle. Bracts ovate. Perianth recurved in mature flowers, outer 3 segments, 4 mm long, oblong, inner narrower. Stamens about as long as the perianth. [7]

1.2. Phytochemical and Antimicrobial activity of *Smilax ovalifolia*
Phytochemical analysis of the leaf extract was carried out in different solvents and the presence of alkaloids, phenol, flavanoid, saponin, amino acid, protein, carbohydrate, glycoside, steroid and terpenoid were confirmed. Phytochemical evaluation of the root extract of *Smilax ovalifolia* is also reported to contain various phytoconstituents such as steroids and gums in petroleum ether extract, carbohydrates, steroids and flavonoids in chloroform extract, and carbohydrates, tannins and phenolic compounds in methanol extract [8]. Antimicrobial activity of the methanolic, ethanolic, chloroform and aqueous was carried out against *Staphylococcus aureus* (MTCC 87), *Escherichia coli* (MTCC 10312), *Pseudomonas aeruginosa (*MTCC-3542), *Proteus mirabilis (*MTCC-3310) *and Aspergillus*

*niger (*MTCC-9652) by well diffusion method. The ethanolic and methanolic leaf extracts extract showed a significant antimicrobial activity against *Escherichia coli, Proteus mirabilis, Pseudomonas aeruginosa* and *Aspergillus niger.*

1.3. Toxicity and Hepatoprotectivity of *Smilax ovalifolia* root

Toxicity study showed that the powdered root of *Smilax ovalifolia* have no significant toxicity towards BRL3A cell line [8]. Hepatoprotectivity study of *Smilax ovalifolia* root has shown to offered protection for BRL3A cell line against paracetamol at the dose of 500 and 1000 µg/ml [8]. Studies have also confirmed that the root of *Smilax ovalifolia* is potential for the hepatoprotective activity by inhibiting NF-κB protein [9].

1.4. Reported Ethnomedicinal Properties

The ethnobotanical uses of *Smilax ovalifolia* is described in Table I

Table I: Reported Ethnobotanical uses of *Smilax ovalifolia*

Sl. No.	Region and Nature of User	Part(s) used for treatment of diseases.
1.	Used as recipe in Bohag Bihu in Assam, India	Juice of leaves is use for treating skin problems [10].
2.	Different Communities in Assam, India.	Tender leaves are eaten as vegetables and fleshy young shoots are eaten raw [11]
3.	Traditional healers of Arunachal Pradesh, India	Root decoction are used along with *Bridelia* and *Smilax perfoliata* for treating Jaundice [12]
4.	*Adi-Minyoug* tribe of Arunachal Pradesh, East Himalaya.	Tender stems used as tooth brush to cure toothache. Tender leaves are used as vegetables[13]
5.	Local people of Villages of Imphal- East District, Manipur, India.	Aerial parts are used in skin disease [14].
7.	Villagers of Senapati District of Manipur, India.	Roots used in Scabies [15].
8.	Herbal Medicine Practitioner in Manipur, India.	Root is used in skin diseases, muscular sprain, stomach pain and rheumatic problem [16].
9.	Ethnic communities of Manipur, India.	Roots are used in urinary complaints [17].
10.	*Naga* and *Kuki* villagers of Senapati district of Manipur, India.	Tender shoots are half cooked and taken as *chutney* with dried fish [18].
11.	Traditional practitioners in the districts of Mokokchung, Kohima Phek and Wokha of Nagaland, India.	Root extract is used to cure arthritis [19].
12.	Village elders of nearby villages of Fakim Wildlife Sanctuary, Nagaland,India.	Areal parts are used in Venereal diseases as well as in sores, dysentery, urinary and rheumatic complaints [20].
13.	Traditional healers of Mizoram, India.	Roots are used in blood dysentery and also as antibiotic, antifungal, antiseptic, blood purifier. Leave juices are used in rheumatism [21].
14.	*Garo* tribe of Rugapara in the South Garo Hills district in the state of Meghalaya, India.	Bark of Stem and root are used in Malaria and Tuberculosis [22].
15.	General local people, experienced aged rural folk, traditional herbal medicine practioners and local herbal drug sellers of Eastern parts of India.	Root paste is mixed with that of *Alangium salvifolium*, *Butea monosperma, Emblica officinalis*, *Asparagus racemosus* and the common paste is taken early morning continuously for 21 days to cure leucorrhoea and infertility [23].
16.	Tribal and local Scheduled Caste populations, 'Kaviraj' (persons having knowledge of Ayurveda), old and experienced tribal person and local aged and experienced practitioners of Dakshin Dinajpur district of West Bengal, India.	The roots are used for treating dysentery and rheumatism. Tender leaves are used as sexual stimulant [24].
17.	*Oriya*, *Kondh* tribe of Phulbani district, Orissa, India.	Roots are mixed along with the roots of and *Asparagus racemosus* and *Aerva lanata* (1:2:1), crushed & aqueous extract is taken two times daily in morning & evening for a week for treating Leucorrhoea [25].
18.	*Kani* tribes of Thachamalai hill, Kanyakumari, Tamilnadu, India.	Decoctions of root and rhizome are consumed in venereal disease, rheumatism, arthritis and urinary discomforts [26].
19.	Local people of Andaman and Nicobar Islands, India.	Roots are used to treat the abnormal semen discharge and in other uterine diseases [27].
20.	Local people of Rupandehi district of central Nepal.	Leaves and shoots are used as vegetables and unripe fruits are eaten [28].
21.	Ethnic groups of Makwanpur, Tanahun, Dang, Bardiya, and Kailali districts of Nepal.	Young shoots are used as vegetable [29].
22.	Central Nepal	Roots are used (inhaled as fumes along with the roots of *A. aspera*) to increase appetite and to cure different types of gastric disorders [30].
23.	Tanahu District, Nepal	Roots are used in sexual diseases [31].
24.	Traditional medical practitioners of different Upazilla (upazila) of Noakhali district namely Begumganj, Maizdi, Senbagh, Chatkhil, Sonaimuri, Kabirhat, Hatiya, Subarnochor and Companigong, Bangladesh.	Roots are use in Wound Healing [32]

2. Conclusion

From the study it can be concluded that *Smilax ovalifolia* is a multipotential medicinal plant and is used by different tribes and communities in different parts of India as well as in other regions. The roots, leaves and tender shoots are variably used in treating different diseases like jaundice, skin problems,

toothache, urinary complain, muscular sprain, stomach pain, rheumatic arthritis, venereal diseases, infertility, as sexual stimulant, in abnormal semen discharge, uterine diseases sores, dysentery, malaria, tuberculosis, leucorrhoea, wound healing, to increase appetite, different types of gastric disorders and also used as antibiotic, antifungal, antiseptic and blood purifier. The plant is also used as vegetable by some groups. The plant can be thus considered as a suitable source for new drug development and synthesis.

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