

REVIEW ARTICLE

Endangered medicinal plants of western ghats: A review

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ABSTRACT

India houses about more than a thousand known medicinal plant species. Traditional Indian medicine, also known as Ayurveda, relies heavily on the use of medicinal plants for treating various ailments. They play a major role in our daily lives. The Western Ghats region in India is known for its rich biodiversity resources including a wide variety of medicinal plants. Western Ghats is among the world's hottest 10 biodiversity hotspots and recently has been added to the world heritage list by the United Nations Educational, Scientific and Cultural Organization (UNESCO). But as these days most of the important medicinal plants present in Western Ghats are facing serious extinction issues and categorized as endangered plants by IUCN due to overexploitation, deforestation and similar anthropogenic activities. At the same time these IUCN reports on threat status highlights the importance of conserving these assets of nature for the betterment of future generations. This article comprehensively reviews the details about some important medicinal plants and their medicinal uses present in Western Ghats which are classified under endangered category.

Keywords: Western Ghats, medicinal plants, endangered, threat status, traditional medicine, traditional knowledge.

1. INTRODUCTION

The plant kingdom represents an extraordinary reservoir of molecules with a variety of astonishingly diverse structural features derived from complex biosynthetic steps. Medicinal plants are a rich bio-resource of drugs for traditional systems of medicine and modern medicines, nutraceuticals and food supplements. Threatened medicinal plants have an important role in traditional herbal medicinal practices and are being widely exploited, leading to near extinction (1)

Climate change, over exploitation, alien species, deforestation, intensive farming and development are causing severe threat to the plant genetic diversity worldwide. This includes the loss of medicinal plant sources also. Medicinal plants play a key role in the treatment of a number of diseases. India possess about 20,000 species of higher plants and one-third of it being endemic and more than 8,000 species are categorized to have medicinal values.

Western Ghats is one of the major repositories of medicinal plants. It houses around

700 species of medicinal plants of which 450 species are threatened and currently the number of species added to the red list category in that region is increasing. Therefore, the valuable genetic resources are being lost at a rapid rate (2)

This review aims on analyzing the current status of endangered medicinal plants present in Western Ghats and to comprehensively study their important medicinal uses and values in traditional medicine.

2. MATERIALS AND METHODS

The present study reviews the literature available from 2011 to 2022. A systematic review was carried out in public databases like Science direct (www.ScienceDirect.com), Research gate (www.Researchgate.com) Springer (www.Springer.com) etc. using the keywords Endangered medicinal plants, Western Ghats. This search resulted in identification of a group of literatures and articles relevant to the scope of this review were selected and critically evaluated.

3. LITERATURE REVIEW

This literature review provides details about some endangered medicinal plants present in Western Ghats and their important medicinal properties.

1. *Trichopus zeylanicus* Gaertn.



Trichopus zeylanicus subsp *travancoricus* (Figure 1) belonging to the family Trichopodaceae is a small herbaceous plant present in the Western Ghats of south India. The indigenous tribal people in Western Ghats use it traditionally for getting instant energy to combat fatigue. Recent pharmacological studies suggested that besides this anti-fatigue property this plant also possess many other medical properties like antioxidant, anti-inflammatory, antistress, antidiabetic, immunomodularity, aphrodisiac, antihyperlipidemic, anticancer, hepatoprotective and anti-microbial activities (3).

2. *Embelia ribes* Burm f.



Embelia ribes Burm f. (Figure 2) belonging the family Myrsinaceae found in hilly parts of India upto 1500 m in Western Ghats. It is a highly endangered medicinal plant mainly used for its digestive, anti-helminthic, carminative and laxative properties. It is also used for treating diabetes, heart diseases, nerve disorders, liver problems and cancerous tumors. The seeds are used for wound healing and it has antioxidant, anti-inflammatory, contraceptive and analgesic properties. Due to the overexploitation of this plant, it has been reported in the red data book as vulnerable plants (4).

3. *Gloriosa superba* L.



Gloriosa superba (Figure 3) is another important endangered medicinal plant present in Western Ghats belonging to the family Colchicaceae. The seeds and tubers of this plant contains valuable alkaloids like colchicine and colchicoside having ethnobotanical and pharmacological properties to treat various diseases. The tuber is used as an antidote for snake bites, rheumatism, gout, bruises, chronic ulcers, cancer, leprosy and skin related problems. Roots are anthelmintic, anti-pyretic and promotes expulsion of the placenta (5).

4. *Coscinium fenestratum* Gaertn.



Coscinium fenestratum (Figure 4) belonging to the family Menispermaceae is considered as a critically endangered medicinal plant. This plant is commonly found in Western Ghats of India. In traditional medicine systems it has been used for curing diabetes mellitus. The stem has anti-microbial, anti-inflammatory and antioxidant properties. The root is considered as a bitter tonic which is used for dressing wounds, treating ulcers and used as a stomachic and antiseptic agent. Stem extract is used for treating snake bites and stem bark is used for treating intermittent fever (6).

5. *Chonemorpha fragrans* Hook.



Chonemorpha fragrans (Figure 5) is an endangered medicinal plant belonging to the family Apocynaceae present in Western Ghats used by the indigenous people in traditional medicine. The roots of this plant possess several medicinal properties like carminative, antihelminthic, and digestive. It also has a wide range of pharmacological properties like antipyretic, anti-amoebic, antidiabetic, antiparasitic and anticancerous properties. It is often used in the treatments of skeletal muscle relaxation, HIV disorder and gynaecological issues (7).

6. *Nothapodytes nimmoniana* Mabb.



Nothapodytes nimmoniana (Figure 6) belonging to the family Stemonuraceae is another important endangered medicinal plant present in Western Ghats. This plant is renowned for the presence of a compound named Camptothecin (CPT) which is used as a relevant anticancer drug. The plant has been explored for its phytochemical, pharmacological and biotechnological aspects (8).

7. *Aegle marmelos* L.



Aegle marmelos (Figure 7) belonging to the family Rutaceae is a medicinal plant widely distributed in the dry deciduous forests of Western Ghats. Its fruit pulp is used for reducing tumor incidence. Essential oils from various parts of this plant are widely used for treating various anti-microbial diseases. Certain studies show that the fruit extract stimulates the antioxidant defense system in diabetic rats. It is also used in the treatment of chronic dysentery, ulcers and diarrhea. Leaf is used for treating abdominal pain, intermittent fever, urinary troubles, seminal weakness and roots are used for curing mental diseases, pericarditis and angina pectoris (9).

8. *Aristolochia indica* L.



Aristolochia indica (Figure 8) belong to the family Aristolochiaceae is an important medicinal plant present in Western Ghats. Overexploitation for medicinal uses had turned this plant into an endangered species. Root extract of this plant act as an antidote for snake and scorpion bite and also used in the treatment of ulcers. The plant contains aristolochich acid which is known for its tumor inhibition property. Essential oil derived from this plant is reported to have moderate antibacterial activity against *Pseudomonas aeruginosa*, *Bacillus subtilis*, *Staphylococcus aureus* and *Escherichia coli* (9).

9. *Baliospermum montanum* Willd.



Baliospermum montanum (Figure 9) belonging to the family Euphorbaceae is another endangered

medicinal plant present in Western Ghats. The roots of this plant have *antihelminthic*, purgative properties and are used as an antidote for snake bites. The five phorbol esters isolated from this plant exhibited inhibitory activity against lymphocytic leukemia (9).

10. *Eugenia singampattiana* Bedd.



Eugenia singampattiana (Figure 10) belonging to the family Myrtaceae and it is a well-known medicinal plant present in Western Ghats. It is commonly known as “Kattukorandi” by the Kanikkar tribes of Agasthiarmalai biosphere reserve, Western Ghats. Recent records show that this plant is endemic to the Singampatti and Papanasam Hills of Kalakad Mundudurai Tiger Reserve forests of Tirunelveli district, Tamil Nadu. Dam construction at the Papanasam Hills and deforestation for tea and other plantations has destroyed this plant’s population. The leaf extract of this plant is used for treating rheumatism by the Kani tribes and leaf paste is used for treating asthma, body pain, giddiness, throat pain, leg sores and gastric problems. Leaves posse’s antioxidant, hepatoprotective and antidiabetic properties (9).

11. *Oroxylum indicum* L.



Oroxylum indicum (Figure 11) belonging to the family Bignoniaceae is a deciduous tree present in Western Ghats. It has been categorised as a

vulnerable medicinal plant by the Govt of India. Fruits of this plant are used for treating leucoderma, bronchitis and helminthiosis. Seeds possess antimicrobial, analgesic and anti-inflammatory properties. This plant also has lipid peroxidation inhibition property too (9).

12. *Pterocarpus santalinus* L.



Pterocarpus santalinus (Figure 12) belonging to the family Fabaceae is an endemic plant present mainly in dry deciduous parts of Western Ghats. The tree is commercially overexploited for the extraction of dye, medicine and cosmetics and hence it led to its addition to the list of endangered species by IUCN in 2012. The lignan compounds isolated from this plant strongly suppress tumor and has antileishmanial activity. The stem bark offer protection against hepatocellular injuries (9).

13. *Rouwolfia serpentina* L.



Rouwolfia serpentina (Figure 13) belongs to the family Apocynaceae is an endangered medicinal plant present in Western Ghats. The root has been used as an antidote for insect bites. It also has antipyretic, oxytocic and sedative properties. Mainly used in the treatment of skin cancers, burns, eczema and snake bites. Root extracts are also effective for gastrointestinal disorders such as diarrhea, dysentery and cholera (9).

14. *Decalepsis hamiltonii* Wight.



Decalepsis Hamiltonii (Figure 14) belonging to the family Asclepediaceae is an

endangered medicinal plant present in Western Ghats. From ancient period itself its tuberous roots has been used in southern part of India as an ethnomedicine by the tribals of Pachamalai Hills. The root extract in powdered form is used as a medicine to cure wounds, fever, bronchial asthma, intrinsic hemorrhage and poisoning. Studies reported that the methanolic and aqueous root extract has high anti-oxidant and anti-inflammatory activities (9).

Table 1. Showing the details about plant, their vernacular names, distribution in Western Ghats, threat status and important medicinal uses

S.No	Plant	Family	Vernacular name	Distribution	Threat status	Parts & medicinal uses
1.	<i>Trychopus zeylanicus</i>	Trichopodaceae	Arogyapachai	Evergreen forests of southern Western Ghats	R	Leaves: antifatigue, antistress, antidiabetic, immunomodulatory, antiulcer, antitumor, hepatoprotective.
2.	<i>Embelia ribes</i>	Myrsinaceae	Vidanga	Northern Western Ghats	R	Seed- Wound healing, antioxidant, anti-inflammatory, analgesic.
3.	<i>Gloriosa superba</i>	Colchicaceae	Kandhal	Throughout Western Ghats	E	Tuber- antidote for snake venom, treating rheumatism, ulcer, cancers, leprosy and skin diseases. Root paste- effective for insect and snake bites.
4.	<i>Coscinium fenestratum</i>	Menispermaceae	Mara manjal	Evergreen forests of Western Ghats	R	Stem- antimicrobial, anti-inflammatory, antidiabetic, antioxidant properties. Roots- curing wounds
5.	<i>Chonemorpha fragrans</i>	Apocynaceae	Perumkurumpa	Throughout Western Ghats	E/V	Roots- carminative, have antihelminthic, antipyretic, antidiabetic, anticancer properties. Enhance skeletal muscle relaxation, cure gynaecological disorders

6.	<i>Nothapodytes nimmoniana</i>	Stemonuraceae	Pillipiccu	Southern parts of Western Ghats	E/V	Camptothecin an alkaloid extracted is used as anticancer, antibacterial and antifungal agent.
7.	<i>Aegle marmelos</i>	Rutaceae	Bilva pazham	Lower hills of Western Ghats	R	Fruit - has antitumor, antimicrobial, antioxidant properties and to cure snake bites, male and female sterility.
8.	<i>Aristolochia indica</i>	Aristolochiaceae	Perumarunthkodi	Throughout Western Ghats	R	Root- used as antidote for snake venom, treat ulcers and have antimicrobial and anti-tumor activities.
9.	<i>Baliospermum montanum</i>	Euphorbaceae	Kattamankku	Throughout Western Ghats	V	Roots-purgative, antidote for snake venom and have anti-helminthic properties .
10.	<i>Eugenia singampattiana</i>	Myrtaceae	Kattukorandi	Throughout Western Ghats	CE	Leaves - to cure rheumatism, asthma, body pain, gastric problems.
11.	<i>Oroxylum indicum</i>	Bignoniaceae	Achi pana arandei	Throughout Western Ghats	V	Fruits - to cure leucoderma, bronchitis, helminthiosis. Seeds- have antimicrobial, analgesic and anti-inflammatory properties.
12.	<i>Pterocarpus santalinus</i>	Fabaceae	Sivappu chandanam	Dry deciduous forests of Western Ghats	R	Stem bark- provides protection from hepatocellular injuries and have antitumor and antileishmanial activities.
13.	<i>Rouvolfia serpentina</i>	Apocynaceae	Chevanamalpodi	Southern parts of Western Ghats	R	Roots- antidote for snake bites, to cure skin cancer, excema.
14.	<i>Decalepsis hamiltonii</i>	Asclepediaceae	Maahakalikizhangu	Dry hills of Western Ghats	E	Roots- to cure wounds, fever, bronchial asthma and hemorrhage.

4. SUMMARY OF REVIEW

The present review reports the current status of 14 endangered medicinal plants present in the Western Ghats of India. Comprehensively studied their threat status and different medicinal uses and the review highlights the threat facing by these valuable assets of nature. This study is being undertaken to bring about awareness among the Herbal practitioners and Environmentalists to take voluntary measures in conserving red listed plants, so that it would be made available to the generations to come. Nature creates, human predated and only humane protects.

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