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Important Medicinal Plants of Western Ghats: A Review

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ABSTRACT

The Western Ghats, also known as the Sahyadrirange, is a mountain range that runs along the western coast of the Indian subcontinent. It stretches over a distance of about 1,600 kilometers (990 miles) from the southern part of India in Tamil Nadu to the state of Gujarat. The Western Ghats is considered as one of theworld's major biodiversity hotspots. It is home to numerous endemicflora and fauna, including many rare and endangered species. The Western Ghats harbor an incredible diversity of plant and animal species. It is estimated to have more than 7, 500 species of flowering plantsand also known for its vast variety of medicinal plants. These medicinal plantshave been used as traditional medicine due to their high medicinal value and plays a major role in the lives ofpeople. Many traditional remedies for ailments and diseases rely on the use of these medicinal plants.

Keywords: Medicinal plants, Western Ghats, Phytoconstituents and Medicinal uses.

INTRODUCTION

India's Western Ghats region is regarded as one of the world's primary hotspots for many plant species because of its great biodiversity. Medicinal plants play a crucial role in the Western Ghats, both ecologically and culturally. It has been used for centuries by local communities and traditional healers for their therapeutic and medicinal properties."The Western Ghats in India is the site of one of the richest tropical forest regions in the world, which is not only of high conservation value but also a treasure house of valuable plants with medicinal and other uses"[1]. India's Western Ghats, also known as the Sahyadri Mountains, are a stunning and environmentally vital terrain that run over 1,600 kilometers along the country's western coast. This vast mountain range is one of the richest tropical forest zones in the world due to its tremendous diversity of flora and fauna in addition to its spectacular beauty."The Western Ghats harbors more than 7,500 flowering plant species, of which nearly 1,500 are recognized for their medicinal values by local communities and traditional healers" [2].The Western Ghats populations' traditional medical practices frequently center on using plant-based treatments. These medicinal plants are carefully chosen, and preparation techniques have been perfected through many years of practice. These plants' medicinal benefits are used to cure a variety of disorders, from simple illnesses like colds, fevers, and stomach problems to more serious medical conditions. "Western Ghats is a treasure trove of medicinal plants, and their bioactive compounds have shown immense potential in drug discovery and development and many plants found in this region have been studied extensively for their bioactive compounds" [3].

Many indigenous communities residing in the Western Ghats have a rich traditional knowledge of medicinal plants and their therapeutic properties. These plants are integral to their healthcare systems, providing solutions for various ailments.

"Ethnomedicinal plants play a significant role in traditional healthcare practices in the Western Ghats, serving as a primary source of healthcare for the local population" [4].The preservation of these plants and their habitats is crucial for the overall conservation of the region. The loss of these plants would not only impact local communities but also limit future possibilities for drug discovery."Conservation of medicinal plants in the Western Ghats is necessary for the preservation of biodiversity and to maintain the traditional knowledge associated with these plants"[5].

IMPORTANT MEDICINAL PLANTS

Embelia ribes Brum F.

Embelia ribes commonly known as Vidanga is an important medicinal plant present in moist deciduous forests of Western Ghats. It is a woody climber belonging to the family Myrsinaceae, categorised as a red listed plant due to the overexploitation ofits main bioactive compound named Embelin which has been widely used in clinical applications in ayurveda and in pharmaceutical industry.

The fruits of Embelia ribes has high medicinal value and it is used for treating headache, hemorrhage, epilepsy, rhinitis and insomnia. Fruit paste is applied for skin infections and dried fruits made into decoction is used for fever, chest problems and skin diseases.The bioactive compound present in this plant exhibits significant antibacterial, antipyretic and anti- fertility activities. Root infusion is used in the treatment of cough and diarrhea.Fruits exhibits antibacterial activity against Escherichiacoli and Staphylococcusaureus[6].

Aeglemarmelos Linn.

Aeglemarmeloscommonly known as Indian bael is a deciduous shrub belonging to the family Rutaceae and present in lower hills of Western Ghats. The fruits of this plant haveanti-tumor, antibacterial and antioxidant properties[7]. Traditionally the fruit is used for treating respiratory problems, diabetes, inflammation, diarrhea and dysentery. Fruits are a rich source of flavonoids, terpenoids, caumarins and carotenoids. The major bioactive components present in this plant includes imperatorin, lupeol, eugenol, cineol and aegelin[8].

Trichopus Zeylanicus Gaertn

Trichopus zeylanicus commonly known as Ginseng is an indigenous medicinal plant belonging to the family Trichopodaceae. It is a small herbaceous plant present in Western Ghats region. Trichopus zeylanicus mainly used as an instant energy stimulant by the traditional tribal people. Besides the anti-fatigue properties, it also shows significant pharmacological properties such as antistress, aphrodisiac, anti-inflammatory, immunomodulatory, anti-tumor, anti-ulcer, hepatoprotective and antidiabetic. In phytochemical analysis different extracts of this plant revealed the presence of various secondary metabolites like flavonoids, alkaloids, terpenoids, tannins, glycosides, steroids and saponins [9] .

Gloriosa Superba Linn.

Gloriosa superba commonly known as Glory Lilly is an important medicinal plant belonging to the family Colchicaceae, which comes under endangered species. The seeds and tubers of this plant is high in important alkaloids like Colchine and colchicoside, Tubers are widely used as an antidote for snake bites and in treatment of rheumatism, gout, bruises, sprains and chronic ulcers. Roots are antipyretic, expectorant, antihelminthic and promotes expulsion of placenta. In case of traditional uses, root tuber mixed with sesamum oil is used to reduce pain in joints due to arthritis. Tribal women prefers this plant to find solutions to problems like menstrual troubles, conception disorders, sterility and delivery problems rather than modern medicines [10] .

Aristolochia Indica Linn.

Aristolochia indica commonly known as the Indian Birthwort is a perennial herb belonging to the family Aristolochiaceae. It is extensively used in traditional medicine, mainly its roots. Root paste is used widely as an antidote for snake bites. Root decoction is consumed as tonic and carminative, also used in the treatment of high blood pressure, Beri Beri and swollen feet, stomach pain, chest pain, fever, skin diseases and malaria. Leaf juice is orally consumed for the treatment of bowel complaints and stomach ache. During night medicated leaf oil is externally applied to protect from snake bites. For treating vomiting and diarrhea, leaves and tender stem administered orally. In phytochemical analysis aristolochich acid was extracted and reported to have anti-tumor and anticancer activities [11] .

Centella Asiatica Linn

Centella asiatica commonly known as Asiatic pennywort is a perennial herb belonging to the family Apiaceae, is an important medicinal plant present in Western Ghats. The whole plant is used for medicinal purpose and widely used as a blood purifier and also in the treatment of high blood pressure, memory enhancement and for promoting longevity. The primary bioactive components present in this plant are saponins mainly triterpenoidsThese triterpenoids have high wound healing activity by inhibiting the production of collagen in the wounded site. Another bioactive compound isolated from this plant named Centelloside and its derivatives exhibited significant effectiveness in the treatment of venous hypertension. The plant extract also shows antidepressant, anxiolytic, antiepileptic, cognitive and antioxidant properties [12].

Achyranthes Aspera Linn.

Achyranthes aspera commonly known as Prickly Chaff flower is a perennial herb belonging to the family Amaranthaceae is a widely used medicinal plant. Almost all parts of this plant are used in traditional medicine, especially seeds, roots and shoots are more important. In traditional medicine it is used in the treatment of cough and asthma. Plant extracts exhibits antiphlegmatic, antiperiodic, diuretic, laxative and purgative properties. Plant parts boiled in water is used for treating pneumonia. Root infusion is used as a mild astringent for bowel complaints. The flowering spikes and seed paste are externally applied for snake bites. Crushed leaves are used to rub strained back. Root paste is useful for curing ophthalmia. Phytochemical studies on seeds of this plant reported the presence of saponins A and B, oleanolic acid, amino acids and hentriacontane [13] .

Coscinium fenestratum Gaertn.

Coscinium fenestratum commonly known as Tree turmeric is a climbing shrub belonging to the family Menispermaceae. It is considered as an endangered plant. In traditional medicine it is widely used for treating diabetes mellitus. The stem is reported to have significant antimicrobial, antidiabetic, antioxidant and anti-inflammatory properties. Root is considered as a bitter tonic and used for treating ulcers, other stomach problems. Stem extract is used as an antidote for snake venom and stem bark is utilized to cure intermittent fever [14].

Cassia Auriculata Linn.

Cassia auriculata commonly known as Tanner's cassia is a medicinal shrub belonging to the family Fabaceae. This medicinal plant has been reported to have antipyretic, antidiabetic, hepatoprotective and antimicrobial activities. Flowers are used to cure urinary discharges, diabetes, throat irritations and nocturnal emissions. Bark is used for treating haemorrhage. Seed powder is best in treating ophthalmia, dysentery, diarrhea, swellings, leprosy, abdominal disorders, worm infections. Leaf extract has significant antioxidant properties. Phytochemical studies on this plant have reported the presence of β-sitosterol, polysaccharides, flavonoids, anthracene derivatives and some dimeric procyanidins, Saponins and tannins [15] .

Bryophyllum Pinnatum Linn.

Bryophyllum pinnatum commonly known as Goethe plant is a herb with high medicinal values, belonging to the family Crassulaceae. The plant parts are widely used for various diseases like conjunctivitis, cholera, asthma, chest colds, asthma, piles, menstrual problems, chicken pox and fever. It is well known for its wound healing, analgesic, hemostatic and anti- inflammatory properties. Leaf extract is used for treating jaundice, renal stones, hypertension and diabetes. In ayurveda it is used for curing menorrhagia, hemorrhoids, ophthalmia and hematemesis. Studies reported that phytochemicals like bryophyllin B and A have been isolated from leaves, and other secondary metabolites including bufadienolides and flavonoids are also isolated from this plant [16] .

Holarrhena pubescens Wall. ex G.Don.

Holarrhena pubescens commonly known as Bitter Oleander is a deciduous tree belonging to the family Apocynaceae is another important ethnomedicinal plant present in Western Ghats, extensively used in traditional medicine and ayurveda. In phytochemical studies the plant extracts revealed the presence of bioactive compounds such as conimine, isoconnessine, conessimine, conessine, conkurchicine, conessidine, holarrhimine, conarrhimine and antidysentericine.

Alkaloids like lettocine is also reported. Traditionally the bark is used for treating jaundice, anemia, stomach pains, dysentery, diarrhea, cholera and epilepsy and it is widely used in the treatment of blood related disorders, leprosy and amebiasis. In Unani medicine leaves are used as a tonic, aphrodisiac and for curing chronic bronchitis, ulcers and used for regulating menstrual cycle. Roots are reported to have abortifacient and aphrodisiac activities. In ayurveda flowers are used as antidiarrheal and antihelminthic agent. Seeds are used to cure dysentery, leprosy, skin diseases, bleeding and piles [17] .

Aristolochia Bracteolata Lam.

Aristolochia bracteolata commonly known as worm killer is a perennial herb belonging to the family Aristolochiaceae. The phytochemical studies on these plants revealed the presence of active alkaloids, aristolochin, allantoin and iso-aristolochic acid. It is widely applied for maggot- infested wounds [18] . Methanolic extract of leaves shows antibacterial activity against certain strains like Escherichia coli, Pseudomonas fluorescens, Shigella flexneri, Proteus vulgaris, Staphylococcus aureus and Klebsiella pneumoniae [19] .

Desmodium gangeticum Linn.

Desmodium gangeticum commonly known as Shal Leafed Bush is a small shrub belonging to the family Fabaceae. During phytochemical studies several bioactive compounds such as alkaloids, phospholipids, pterocarpans, sterols, flavones and flavonoid glycosides were isolated. Crude extracts taken from this plant showed significant pharmacological activities like immunomodulatory, antiasthmatic, smooth muscle relaxant, anti-inflammatory, anti-ulcer, cardio-protective, antidiabetic, antiamnesic, antiviral, antioxidant and hepatoprotective activities. Desmodium gangeticum has the ability to scavenge the free radicals released during ischaemia and ischaemia reperfusion and hence preserving the mitochondrial respiratory enzymes and eventually lead to cardio-protection. It is also reported that it has significant prophylactic and therapeutic efficacy against Leishmania infection [20] .

Cinnamomum Tamala (Buch. -Ham.)

Cinnamomum tamala commonly known as Indian bay leaf belonging to the family Lauraceae is a medicinal plant endemic to Western Ghats. This plant is a good repository of bioactive compounds mostly present in the bark, such as essential oils that have important pharmacological properties like antitumor, antidiarrheic, anti-inflammatory, anti-arthritic, antiparasitic, gastrourinary, antitumor, antiparasitic, antioxidant, chemopreventive, and gastroprotective. As said above plant bark is rich in essential oils which are effective in curing Alzheimer's disease and arteriosclerosis. Leaves and fruits contain essential oils which have significant termiticidal, nematicidal, larvicidal, microbicidal, antipyretic and anxiolytic activity.

Plant Contains

cinnamaldehyde, cinnamic acid, cinnamate, which has significant therapeutic effects against cancer and inflammatory, cardioprotective, and neurological disorders. Plants leaves are rich in nutrients like manganese, iron, dietary fiber, and calcium. Leaves and

barks have astringent, stimulant and carminative activities and are used for treating rheumatism, diarrhea, nausea and vomiting in traditional medicine [21] .

Rubia Cordifolia Linn.

Rubia cordifolia commonly known as Indian Madder is a climber belonging to the family Rubiaceae. Phytochemical studies reported different kinds of bioactive compounds in this plant such as anthraquinones and their glycosides, naphthoquinones and glycosides, terpenes, bicyclic hexapeptides, iridoids, carboxylic acids (malic, citric, quinic, rosmarinic acids) and saccharides (xylose, ribose, fructose, glucose, sucrose, primverose) in traditional medicine it is widely used to treat haematemesis, inflammations, haematuria, skin diseases and ulcers. Roots are used to treat various pigmentation anomalies of skin, leucoderma and is an excellent aid for the promotion of complexion [22] .

Table 1: Showing the details of plant, their common names, phytoconstituents present and medicinal uses

Sl.No	Plant	Common name	Family	Major Phytoconstituents	Medicinal Value
1.	Embeliaribes	Vidanga	Myrsinaceae	Embelin, Embeliol, Embelinol, Christembin, Daucasterol	**Fruit paste**: To cure headache, hemorrhage, epilepsy, rhinitis, insomnia, chest problems, skin infections **Root infusion**: cough, diarrhea.
2.	Aeglemarmelos	Indian Bael	Rutaceae	Flavonoids, terpenoids, caumarins, carotenoids, imperatorin, lupeol, eugenol, cineol, aegelin	**Fruit:**To cure respiratory problems, diabetes, inflammation, diarrhea and dysentery.
3.	Trichopuszeylanicus	Ginseng	Trichopodaceae	Flavonoids, alkaloids, terpenoids, tannins, glycosides, steroids.	Have anti-fatigue, aphrodisiac, anti-inflammatory, immunomodulatory, anti-tumor, anti-ulcer, hepatoprotective and antidiabetic properties
4.	Gloriosasuperba	Glory Lilly	Colchicaceae	Colchicine, Colchine, Colchicoside, alkaloids	**Tubers :** To cure rheumatism, gout, bruises, sprains and chronic ulcers, antidote for snake venom. **Roots**: Antipyretic, expectorant, antihelminthicand promotes expulsion of placenta **Roottubers**: To cure arthritis.
5.	Aristolochiaindica	Indian Birthwort	Aristolochiaceae	Aristolochich acid, sitosterol, friedelin, cycloeucalenol and rutin	**Rootpaste**: antidote for snake venom **Rootdecoction**: tonic, carminative, to treat BeriBeri, swollen feet, stomach pain, chest pain. **Leafjuice**:To cure bowel complaints, stomach ache.
6.	Centellaasiatica	Asiatic pennywort	Apiaceae	Centelloside, saponins and triterpenoids.	Whole plant is used as blood purifier, memory enhancement and for promoting longevity.
7.	Achyranthesaspera	Prickly Chaff	Amaranthaceae	Saponin A and B, oleanolic acid, amino acids and	**Rootinfusion** : mild astringent for bowel

		flower		hentriacontane	complaints. **Seeds:** antidoteforsnakevenom**.** **Rootpaste:**to cure ophthalmia l
8.	Cosciniumfenestratum	Tree Turmeric	Menispermaceae	Berberine, Jatrorrhizine, Palmatine, Tetrahydropalmatine, Magnoflorine, Isocorydine, Glaucine	**Stem:**Have antimicrobial antidiabetic, antioxidant properties. **Roots:**To cure ulcer, stomach pain.
9.	Cassiaauriculata	Tanner's Cassia	Fabaceae	Sitosterol, polysaccharides, flavonoids, anthracene, dimeric procyanidine, saponins and tannins.	**Flowers:**To cure urinary discharges, diabetes, throat irritations and nocturnal emissions. **Seed powder:** to cure ophthalmia, dysentery, diarrhea, swellings, leprosy, abdominal disorders and worm infections.
10	Bryophyllumpinnatum	Goethe Plant	Crassulaceae	Bryophyllin A and B, Bufadienolides and flavonoids	**Leafextract**: To cure jaundice, renal stones, hypertension, diabetes, hematemesis, asthma, piles and conjunctivitis.
11	Holarrhenapubescens	Bitter Oleander	Apocynaceae	Conimine, Isoconnessine, Conessimine, Conessine, Holarrhimine, Conarrhimine, Antidysentericineand Lettocine.	**Bark:**To cure anemia, jaundice, stomach pain, dysentery, diarrhea, cholera, epilepsy, leprosy, amebiasis **Flowers:** Have antidiarrheal and antihelminthic properties. **Seeds:**To cure dysentery, skin diseases, bleeding and piles.
12	Aristolochiabracteolata	Worm Killer	Aristolochiaceae	Aristolochin, Allantoin,Iso-aristolochich acid and alkaloids	**Leaves:**have antibacterial activity and widely used for curing maggot-infested wounds.
13	Desmodiumgangeticum	Shal Leafed Bush	Fabaceae	Alkaloids, phospholipids, pterocarpans,sterols, flavanones and flavanoid glycosides.	Crude extract has anti-inflammatory, antiulcer, cardio protective, hepatoprotective, antiviral properties and used to cure Leishmania.
14	Cinnamomumtomala	Indian Bay Leaf	Lauraceae	Cinnamaldehyde, Cinnamic acid, Cinnamate and essential oils	**Leaves:**To cure rheumatism, diarrhea, nausea, vomiting **LeafandFruit:**Havetermiticidal, nematicidal, larvicidal, antipyretic and anxiolytic activities.
15	Rubiacordifolia	Indian Madder	Rubiaceae	Anthraquinone,napthaquinones, glycosides, terpenes, iridoids, carboxylic acid and saccharides	Widely used to cure hematemesis, inflammation, haematuria, skin diseases and ulcers. **Roots:**To treat pigmentation anomalies of skin and leucoderma.

SUMMARY

The present review reports the medicinal importance and major phytoconstituents of 15 medicinal plants present in Western Ghat region. Comprehensively studied their significance in modern as well as traditional medicine. Most of them are now facing serious existential crisis due to the overexploitation of resources so this is high time to create new conservation methods or strategies to preserve this important asset for the betterment of future generations. This study is being undertaken to spread awareness among researchers and environmentalists about the significance of these medicinal plants.

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