

Chapter 1

Justicia adhatoda L.: A medicinal shrub of India

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ABSTRACT

Acanthaceae is recognized as the largest family of herbs and shrubs belonging to the order Lamiales. *Justicia adhatoda* L. is one of the medicinal plants used by tribal healers. It is a perennial shrub. In many tribal villages, it is planted. It possesses several secondary metabolites like alkaloids, tannins, saponins, phenolics, and flavonoids to cure many diseases such as cuts, wounds, cough, fever, skin inflammation, rheumatism, and pneumonia. Keeping this in view an attempt has been made to present its botany, ethnomedicinal uses, and pharmacological uses to bring attention towards its conservation aspects in their natural habitat. The photographs are provided for easy identification in the field.

Keywords: *Justicia*, traditional knowledge, secondary metabolites, pharmacological uses

INTRODUCTION

Lamiales an order of 23,000 species includes the Acanthaceae family which has 4300 species in 346 genera. Acanthaceae have been derived from Scrophulariaceae or stock ancestral. The family includes a large number of ornamental as well as medicinal plants due to the presence of alkaloids in the leaves (Sharma and Kumar 2016). Genus *Justicia* represents about 600 species which are distributed in the tropics and temperate regions (Carneiro et al. 2023). *Justicia* species are traditionally used to treat several health problems like anemia, epilepsy, kidney problems, respiratory, and gastrointestinal diseases (Carneiro et al. 2023). Under Acanthaceae, *Justicia adhatoda* L., is one of the medicinal plants used by tribal healers to cure common ailments such as cuts, wounds, and fever. It is a well-renowned botanical remedy in Ayurveda and Unani medicine (Wangujare et al. 2023). It is an evergreen shrub and generally known as the Malabar nut. It is mostly found near villages, sometimes planted in hedges (Figure 1). It is found throughout the plains of India and subtropical Himalayas, Myanmar, Sri Lanka, and Indo-China. The flowering and fruiting period is from June to February (Saxena and Brahmam 1995). It is bitter in taste due the presence of quinazoline alkaloid, and vasicine in leaves, roots, and flowers.

Essential oils, sugar, fats, resins, proteins, amino acids, and vitamin C are reported from *J. adhatoda* (Banerjee and Gupta 2021). The whole plant of *J. adhatoda* possesses some medicinal properties such as diarrhea, stomach pain, and cancer (Aziz et al. 2017). The documentation of traditional knowledge on the utilization of local plant resources by ethnic people or communities is one of the main objectives of the ethnomedicinal survey as leaves are used as a cuisine source in Manipur by the Meitei community it serves as a food as well as medicinal value (Singh and Huidrom 2023). It holds ecological value as many butterflies pollinate it. Many scientific studies have indicated that it possesses antibacterial, antifungal, anti-asthmatic, anti-inflammatory, and anti-ulcer (Chowdhury et al. 2020). During COVID-19, it is also one of the promising factors for antiviral activity (Banerjee and Gupta 2021).



Figure 1: Habitat of *Justicia adhatoda* near village areas

DESCRIPTION

The stem has many long opposite ascending branches; the bark is yellowish in color. Leaves large, elliptic, elliptic-lanceolate or ovate-lanceolate, acuminate, minutely pubescent, base cuneate. Flower white, subsessile, large, axillary and terminal, sometimes thysiform spikes; bracts ovate, elliptic, or obovate. Calyx equal, lanceolate, imbricate, or lowest sub connate. Corolla 2- lipped, tube short, upper lip galeate, subentire. Stamens near the top of corolla-tube; filament hairy at base only. Capsule clavate – oblong, pubescent. Fruits are pubescent, club-shaped capsules. Seed suborbicular, compressed, rugose (Saxena and Brahmam 1995; Figure 2).



Figure 2: Morphology of *J. adhatoda* a) Shrub, b) Front view of flower, c) Leaves, d) Side view of flower

ETHNOMEDICINAL USES

Leaves paste are used to treat fever, cuts and wounds (**Present study; Figure 3**). Leaves and roots treat rheumatism, pneumonia, cough, asthma, eye and ear ailments, asthma, and tuberculosis (**Singh and Huidrom 2023**). Fruits of *J. adhatoda* are used to treat colds, jaundice, bronchitis, diarrhea, dysentery, and fever (**Khan et al. 2018**). The root is used to treat diarrhea (**Kanhar et al. 2021**). The whole plant treats menorrhagia, excessive phlegm, and bleeding piles. Whole plant mix with *Zingiber officinale* (ginger), and *Ocimum sanctum* (tulsi) are used to treat antispasmodic. Leaves paste is used to treat skin diseases and wounds. Root decoction is used for gonorrhea. The fresh flower is used for ophthalmia. The fruit of *J. adhatoda* is used to cure bronchitis and jaundice (**Dhankhar et al. 2011; Wangujare et al. 2023**). Leaves paste is used to cure chest diseases, and reduce swelling (**Awan et al. 2014**).

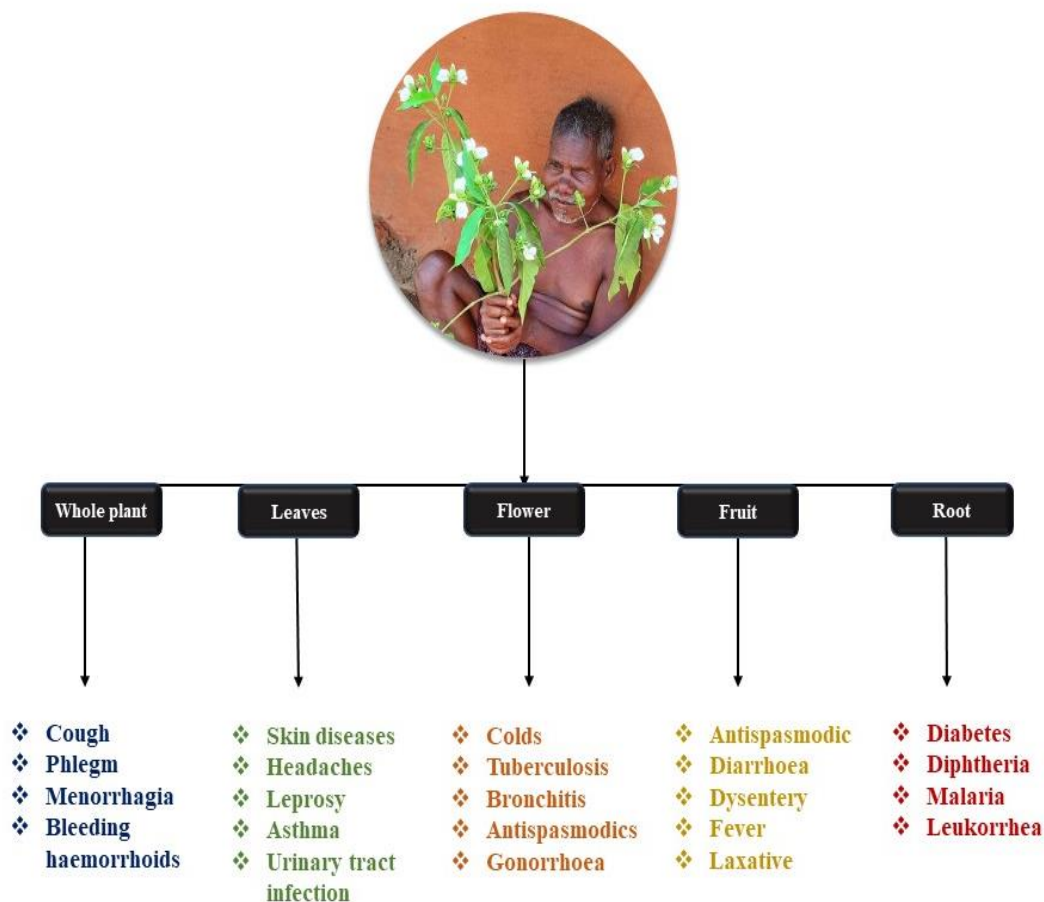


Figure 3: Medicinal values used by Indigenous people

BIOACTIVE COMPOUNDS

Plant contains alkaloids, quinazoline alkaloids, vasicine, tannins, saponins, phenolics, flavonoids, reducing sugars, anthraquinones, and flavonoids. Other compounds are Decosanoic acid, salicylic acid, campesterol, stigmasterol, sitosterol, sitosterol – D-glucoside, ridols, diterpenoids, triterpenoids (Saravanan 2022; Dhankhar et al. 2011).

ECONOMIC USES

Seeds has market value. Flower is mostly used as ornamental purposes (Sharma and Kumar 2016).

PHARMACOLOGICAL USES

It possesses antibacterial, antifungal, insecticidal, antitussive, abortifacient, antimicrobial, cardiovascular protection, anticholinesterase, anti-inflammation (Khan et al. 2018; Dhankhar et al. 2011; Wangujare et al. 2023).

CONCLUSION

The study concludes that it is an important source of many pharmacologically and medicinally important in Acanthaceae family. Mostly in this family it comprises ornamental plants but have significant medicinal values which cure certain ailments.

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