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Review Article

Diversity and ethnomedicinal values of genus *Crotalaria* L.

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Abstract: The genus *Crotalaria* (Fabaceae) includes numerous species that have traditionally been used in folk medicine for various therapeutic purposes. Despite their importance in ethnopharmacology, there is limited comprehensive documentation of this species' medicinal potential. The present study combines extensive literature surveys on the medicinal uses of *Crotalaria* species, analysing data from major scientific databases. The results indicated consistent therapeutic applications across many species, particularly in areas such as anti-inflammatory, antimicrobial, detoxifying, and wound-healing properties. These effects are likely associated with bioactive compounds such as flavonoids, alkaloids, and phenolics. While species like *C. juncea*, *C. laburnifolia*, and *C. sessiliflora* have been well-studied, others, including *C. acicularis* and *C. wightiana*, lack ethnomedicinal records. This suggests that there may be regional knowledge or traditional practices that have not been traditionally documented. The study emphasizes the significant ethnomedicinal relevance of *Crotalaria* species and highlights the necessity for integrative research that combines ethnobotanical documentation, phytochemical profiling, and pharmacological validation. These findings provide a scientific basis for future bioprospecting and safe development of therapeutics derived from *Crotalaria* species.

Keywords: Fabaceae, distribution, India, traditional knowledge

Introduction

The genus *Crotalaria* L., which belongs to the family Fabaceae, is a large and diverse group of plants comprising over 700 species distributed throughout tropical and subtropical regions of the world (Muli et al., 2022). In India, the *Crotalaria* genus is represented by about 120 species (Ravi et al., 2023). Commonly known as “rattlepods,” these species range from herbs and shrubs to small trees and are well adapted to various habitats, including grasslands, forest margins, and wastelands (Wu et al., 2003). In addition to their role as nitrogen-fixing plants that enrich soil fertility, *Crotalaria* species hold considerable importance for their economic, ecological, and medicinal importance (Arone et al., 2024). Their wide distribution and morphological diversity make them a significant component of tropical flora, particularly in regions where they support traditional livelihoods and maintain ecosystem balance (Rather et al., 2018). The ethnomedicinal significance of *Crotalaria* species is deeply rooted in indigenous knowledge systems (Rouamba et al., 2018). Different species are used in traditional medicine to treat a variety of ailments, including inflammation, fever, wounds, jaundice, cough, and skin infections (Kumari and Kumar, 2022). For instance, *C. medicaginea* has demonstrated notable antidiabetic and anticancer properties (Ali et al., 2023), while *C. sessiliflora* is traditionally utilized in the treatment of oesophagal and cervical cancers (Tang et al., 2017). Similarly, *C. laburnifolia* and *C. retusa* are employed to treat snake and scorpion bites (Shankar et al., 2008; Aragao et al., 2017). These medicinal applications are attributed to the presence of bioactive compounds such as flavonoids, alkaloids, phenolics, and terpenoids, which contribute to their antimicrobial, anti-inflammatory, analgesic, and anticancer activities (Kusar et al., 2024). Despite their abundance and traditional uses, many *Crotalaria* species remain underexplored for their phytochemical and pharmacological potential. Comprehensive ethnobotanical documentation not only helps preserve traditional knowledge but also lays the foundation for future scientific validation and drug discovery. Exploring the diversity and medicinal potential of *Crotalaria* species will contribute both to the conservation of this ecologically valuable genus and to the development of novel plant-based therapeutic agents.

Methodology

Extensive literature surveys were conducted to document the ethnomedicinal uses of *Crotalaria* species in India. The process involved systematic searches through well-known scientific databases, including Scopus, Crossref, Google Scholar, and Web of Science, to collect and analyse published scholarly works on the medicinal uses of *Crotalaria* species (Kumar, 2025). The information gathered from these sources was critically evaluated and systematically compiled. The ethnomedicinal data were tabulated, detailing the specific therapeutic applications of each *Crotalaria* species. This provides a consolidated reference for their traditional and potential pharmacological significance (Jena et al., 2025; Kumar, 2025).

Results and discussion

The present study documented the ethnomedicinal values of 36 species of *Crotalaria* through an extensive literature review (Table 1). Among the documented species, a significant number were reported to possess known medicinal uses, while others lacked available ethnomedicinal records. Most

of the recorded species were herbaceous, with only a few being shrubs. The widespread use of Crotalaria species in traditional medicine underscores their importance in indigenous healthcare systems and highlights their potential as a source of bioactive compounds for pharmaceutical research.

Table 1: Ethnomedicinal values of different *Crotalaria* species

Scientific name	Vernacular name	Habit	Medicinal uses	Source
Crotalaria acicularis Buch.-Ham. ex Benth.	NIL	Herb	NIL	NIL
Crotalaria alata Buch.-Ham. ex D.Don (Figure 1a)	Jhumka	Herb	It is used as an anticoagulant.	Sumi et al., (2015)
Crotalaria albida B.Heyne ex Roth	Jhunjhuni	Herb	It helps alleviate inflammation and treat cough, fever, and mastitis.	Jiang et al., (2022)
Crotalaria burhia Buch.-Ham. ex Benth.	Saniya	Herb	It is used for typhoid, wounds and cuts, rheumatism, flatulence, earaches, nasal bleeding, and stone problems.	Wal et al., (2023)
Crotalaria calycina Schrank	Silky-haired rattlepod	Herb	It is used as an analgesic and anti-inflammatory agent.	Mazumder et al., (2022)
Crotalaria clarkei Gamble	Hairy-pod rattlepod	Herb	NIL	NIL
Crotalaria epunctata Dalzell	Ban methi	Herb	NIL	NIL
Crotalaria evolvuloides Wight	Bindweed rattleweed	Herb	NIL	NIL
Crotalaria globosa Wight & Arn.	Spherical rattlepod	Herb	It is used to remove toxins from the body.	Deepha et al., (2014)
Crotalaria grahamiana Wight & Arn.	Bushy rattlepod	Herb	It is used as anti-inflammatory agent.	Vanitha et al., (2012)
Crotalaria hirsuta Willd.	Hairy rattlepod	Herb	NIL	NIL
Crotalaria hirta Willd.	NIL	Herb	NIL	NIL
Crotalaria humifusa Graham ex Benth.	Sprawling rattlepod	Herb	NIL	NIL
Crotalaria incana L.	Woolly rattlepod	Herb	It is used for the treatment of jaundice and palpitation, inflammation, and, skin disease.	Alemu et al., (2015)
Crotalaria juncea L.	Choni	Shrub	It is used for the treatment of anaemia, menorrhagia and psoriasis.	Samuel and Sorna Kumar, (2020)

Crotalaria laburnifolia L.	Muna	Shrub	It is used to cure cough, as well as snake and scorpion bites.	Shankar et al., (2008); Maroyi, (2023)
Crotalaria leioloba Bartl.	Rusty rattlepod	Herb	NIL	NIL
Crotalaria medicaginea Lam. (Figure 1c)	Medick rattlepod	Herb	It is used for the treatment of diabetes and also possesses anticancer, antibacterial and antioxidant activities.	Ali et al., (2023)
Crotalaria montana Roxb. ex Roth	Mountain rattlepod	Herb	NIL	NIL
Crotalaria mysorensis Roth	Mysore rattlepod	Herb	The seeds are used for enhanced urination in cattle. Leaves are made into a paste and taken orally to treat gastric problems.	Bi et al., (2018)
Crotalaria nana Burm.f.	Tiny rattlepod	Herb	NIL	NIL
Crotalaria orixensis Willd.	Orixa rattlepod	Herb	It is used against malaria.	Narender et al., (2005)
Crotalaria pallida Aiton (Figure 1b)	Junjunka	Herb	It is used to treat joint pain and urinary tract infections.	Patel et al., (2025)
Crotalaria prostrata Rottler ex Willd.	Vishnukarni	Herb	It is used to remove toxins from the body.	Devendra et al., (2012)
Crotalaria pusilla Roxb. ex Roth	Small rattlepod	Herb	NIL	NIL
Crotalaria quinquefolia L.	Five-leaf rattlepod	Herb	It is used to treat scabies, fever, discomfort, and lung infections.	Hasan Zilani et al., (2025)
Crotalaria ramosissima Roxb.	Unifoliate rattlewort	Herb	Leaves are used to treat wounds.	Suthari et al., (2014)
Crotalaria retusa L.	Ghunghunian	Herb	The plant is used to treat skin infections, fever, lung diseases, leprosy, and as an analgesic against scorpion stings and snake venom.	Rouamba et al., (2018)
Crotalaria sessiliflora L.	Stalkless blue rattlepod	Herb	It is used in the treatment of oesophageal cancer, cervical cancer and skin cancer. It is also used as a diuretic, a cardiotonic, an analgesic, and a	Yoo et al., (2004); Tang et al., (2017)

			haemogogue in folk medicine.	
Crotalaria spectabilis Roth	Jhunka	Herb	It is used externally and internally for the cure of scabies and impetigo.	Silva et al., (2023)
Crotalaria tetragona Roxb. ex Andrews	Eastern rattlepod	Herb	NIL	NIL
Crotalaria trifoliastrum Willd.	NIL	Herb	Root is used as a purgative.	Rao and Rao, (1999)
Crotalaria triquetra Dalzell	Three-angled rattlepod	Herb	NIL	NIL
Crotalaria umbellata Wight & Arn.	NIL	Herb	NIL	NIL
Crotalaria verrucosa L. (Figure 1d)	Jhunjhunia	Herb	Root is used against scorpion and snake bites.	Suthari et al., (2014)
Crotalaria wightiana Graham ex Wight & Arn.	NIL	Shrub	NIL	NIL

The results showed that various species of *Crotalaria* are used to treat a wide range of ailments, demonstrating their diverse therapeutic applications. Common medicinal uses include treatments for inflammation (*C. albida, C. calycina, C. grahamiana*), fever (*C. albida, C. retusa, C. quinquefolia*), and skin disorders (*C. retusa, C. sessiliflora, C. spectabilis*). Some species, such as *C. laburnifolia* and *C. verrucosa*, are used to treat snake and scorpion bites, while *C. juncea* is known for its effectiveness in treating anaemia and menorrhagia. Furthermore, *C. medicaginea* and *C. sessiliflora* have been reported to possess anticancer and antioxidant properties, underscoring their potential pharmacological importance. The documented ethnomedicinal uses suggest that *Crotalaria* species contain active compounds with various therapeutic effects, which merit further scientific validation. The data reveal recurrent therapeutic themes across *Crotalaria* species, particularly in anti-inflammatory, antimicrobial, detoxifying, and wound-healing applications. These consistent uses may be linked to the presence of similar phytochemical constituents within the genus, such as flavonoids, alkaloids, and phenolic compounds. Previous studies have reported that *Crotalaria* species contain pyrrolizidine alkaloids, which, despite their known toxicity at higher concentrations, exhibit significant biological activity when extracted and purified properly (Yoo et al., 2004; Flores et al., 2009; Tang et al., 2017; Prada et al., 2020). Additionally, the patterns of traditional medicinal use reveal an uneven distribution of knowledge among different species. While *C. juncea*, *C. laburnifolia*, and *C. sessiliflora* are well-documented for their medicinal uses (Samuel and Sorna Kumar, 2020; Maroyi, 2023; Yoo et al., 2004), other species such as *C. acicularis*, *C. clarkei*, *C. humifusa*, and *C. wightiana* are less represented in the literature. This disparity indicates that ethnobotanical knowledge and the pharmacological potential of certain taxa may be regionally confined or underreported. The recognition and preservation of traditional medicinal knowledge not only support cultural heritage but also provide opportunities for modern drug discovery. Further studies focusing on the isolation of bioactive compounds and testing their efficacy both *in vitro* and *in vivo* will be essential for transforming the traditional uses of *Crotalaria* species into scientifically validated therapeutic applications.

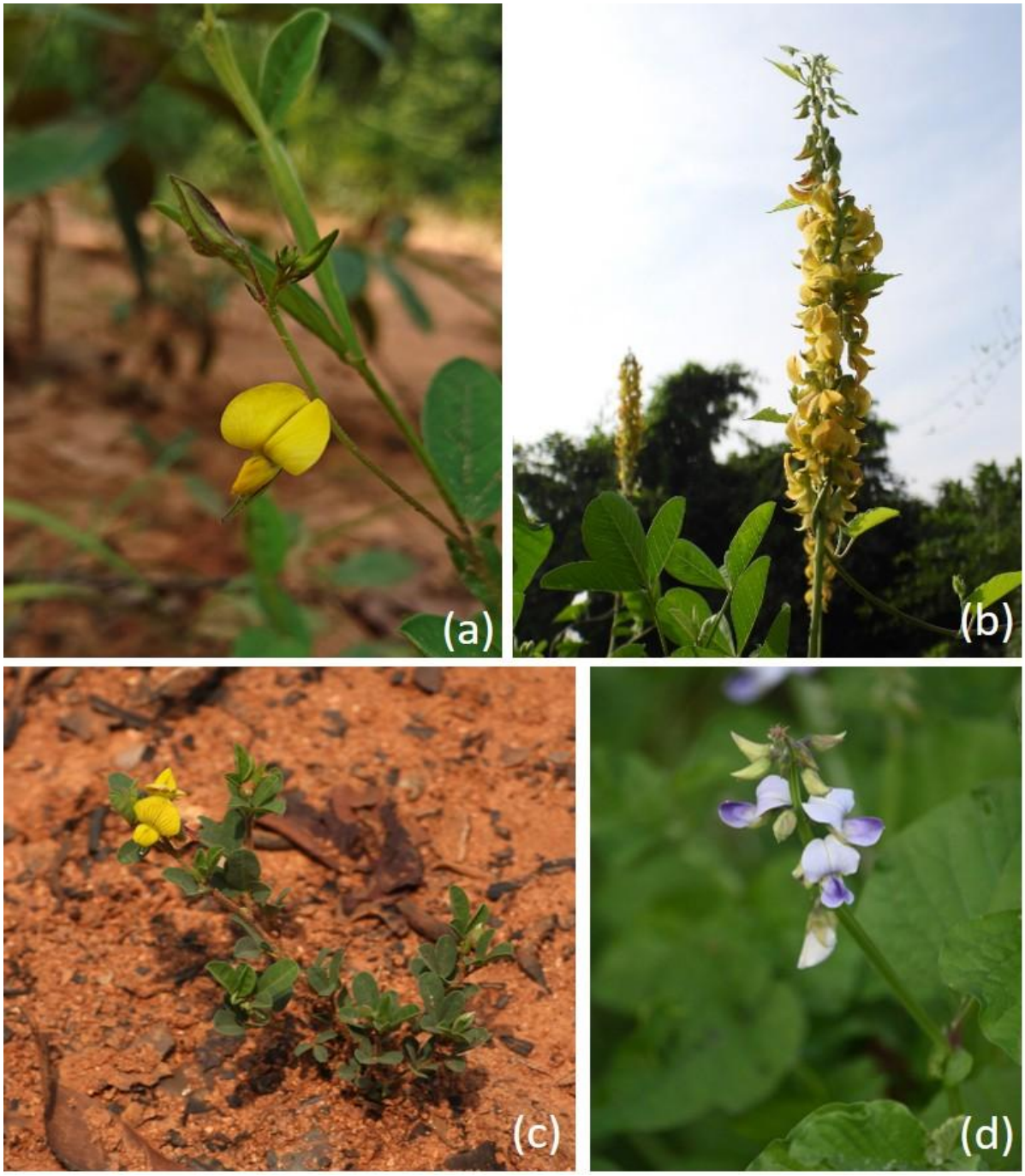

Figure 1: Morphological and floral details of various species of *Crotalaria*: (a) *Crotalaria alata*, (b) *Crotalaria pallida*, (c) *Crotalaria medicaginea*, and (d) *Crotalaria verrucosa*

Conclusion

The present study emphasizes the rich ethnomedicinal diversity of *Crotalaria* species and their continued importance in traditional healthcare systems. Out of the thirty-six species examined, more than half are reported to possess medicinal properties, primarily used to treat inflammation, fever, skin infections, wounds, and toxic bites. These traditional applications suggest the presence of pharmacologically active compounds such as flavonoids, alkaloids, and phenolics, which warrant thorough phytochemical and pharmacological investigation. However, several species remain

unexplored or under-documented, indicating untapped potential for future research. Therefore, combining traditional ethnobotanical knowledge with modern scientific approaches could lead to the discovery of novel bioactive molecules, contributing to both drug development and the sustainable utilization of medicinal plant resources within the genus *Crotalaria*.

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