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Review Article

Ethnomedicinal and pharmacological values of *Allophylus serratus* (Roxb.) Kurz (Sapindaceae)

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Abstract: Medicinal plants have long served as a foundation for traditional healthcare systems and continue to provide valuable leads for modern drug discovery. *Allophylus serratus* (Roxb.) Kurz, belonging to the family Sapindaceae, is a well-documented ethnomedicinal plant widely used in indigenous medicine for the treatment of ulcers, inflammation, gastrointestinal disorders, infections and bone-related ailments. Different plant parts, including leaves, roots, stem bark, flowers, seeds and fruits, are employed either individually or in combination. Over the past few decades, scientific investigations have validated many of these traditional claims, revealing significant anti-ulcerogenic, antibacterial, anti-inflammatory, antioxidant and anti-osteoporotic activities. Present study critically compiles and analyzes available ethnomedicinal knowledge, pharmacological evidence and phytochemical insights related to *A. serratus*, emphasizing its therapeutic relevance and future research potential.

Keywords: Anti-ulcerogenic activity, ethnomedicine, pharmacology, Sapindaceae

Introduction

Traditional medicinal systems, including Ayurveda, Siddha, Unani and folk medicine, rely extensively on plant-based remedies for the prevention and treatment of various diseases (Pandey et al., 2013).

According to the World Health Organization (WHO), a significant proportion of the global population continues to depend on medicinal plants for primary healthcare (Palhares et al., 2015). The increasing prevalence of chronic disorders such as peptic ulcers, inflammatory diseases, microbial infections and osteoporosis has intensified the search for safe, affordable and effective therapeutic agents derived from natural sources (Fatima et al., 2025). Plants belonging to the family Sapindaceae are known for their diverse pharmacological properties, including antioxidant, antimicrobial, anti-inflammatory and gastroprotective activities (Shah et al., 2017). Within this family, the genus *Allophylus* comprises several species that are traditionally valued for their medicinal applications (Chavan and Gaikwad, 2016). Among them, *Allophylus serratus* (Roxb.) Kurz has gained particular attention due to its extensive use in ethnomedicine and growing scientific validation (Dharmani et al., 2005). *A. serratus* is traditionally employed for the management of gastrointestinal disorders such as ulcers, dyspepsia, diarrhoea and anorexia, as well as systemic conditions including inflammation, elephantiasis, bone fractures, fever and parasitic infections (Dharmani et al., 2005). The repeated use of this plant across different regions and cultures suggests the presence of potent bioactive compounds responsible for its therapeutic effects (Jemal et al., 2022). Ethnomedicinal knowledge often serves as a guiding tool for pharmacological research and *A. serratus* represents a classic example where traditional claims have stimulated experimental investigations (Agrawal, 2018). Peptic ulcer disease and inflammatory disorders remain major global health concerns, often associated with oxidative stress, microbial infections such as *Helicobacter pylori* and prolonged use of non-steroidal anti-inflammatory drugs (Narayanan et al., 2018). Conventional therapies, although effective, are frequently associated with adverse effects and recurrence of disease (Debas et al., 2006). In this context, medicinal plants like *A. serratus* offer promising alternatives due to their multitargeted actions and lower toxicity profiles (Greenwell and Rahman, 2015). Additionally, recent studies highlighting its anti-osteoporotic and bone-healing potential further expand the therapeutic scope of this plant (Kumar et al., 2010). The present study aims to provide a comprehensive and updated overview of the ethnomedicinal uses, pharmacological properties and phytochemical basis of *A. serratus*. Through documentation of traditional knowledge with experimental evidence, the study seeks to highlight the medicinal importance of *A. serratus* and identify gaps for future research and clinical applications.

Botanical description and distribution

Allophylus serratus (Roxb.) Kurz is a small tree or shrub belonging to the family Sapindaceae. It is widely distributed in tropical and subtropical regions of India and neighbouring countries. The plant is characterized by compound, serrated leaves, small inconspicuous flowers and fleshy fruits. Its adaptability to diverse ecological conditions has contributed to its wide availability and extensive use in traditional medicine (Saxena and Brahmam, 1994).

Ethnomedicinal Uses

Ethnomedicinal records reveal that *A. serratus* is a multipurpose medicinal plant used in the treatment of a wide range of ailments (Jemal et al., 2015). Various plant parts are harvested seasonally and prepared as decoctions, infusions or powders for therapeutic use. Traditional healers utilize different plant parts depending on the nature of the disease, indicating a deep understanding of its medicinal properties. The frequent use of *A. serratus* in gastrointestinal disorders, particularly ulcers, strongly correlates with its documented gastroprotective activity. Its application in elephantiasis and inflammatory conditions suggests immunomodulatory and anti-inflammatory effects, while its use in bone fractures indicates possible roles in bone regeneration and mineral metabolism (Table 1).

Figure 1: Fruits and leaves of *Allophylus serratus*, a) Fruits, b) Leaves and c) Habitat

Table 1: Ethnomedicinal uses of *A. serratus*

Plant parts	Uses	Source(s)
Fruits	Used to treat stomach worms and fever.	Agrawal, (2018)
	Used as a tonic.	Priya et al., (2012)
Leaves	Used to treat stomach ulcers.	Agrawal, (2018)
Stem bark	Used for the treatment of elephantiasis.	Agrawal, (2018)
Whole plant	Used to treat ulcers, inflammation and gastrointestinal disorders.	Srinivas et al., (2013); Agrawal, (2018); Ahmed et al., (2021)
	Used to treat elephantiasis, inflammation, bone fractures, dyspepsia, anorexia and diarrhoea.	Yadav et al., (2024)

Pharmacological activities

Scientific studies have provided substantial evidence supporting the traditional claims associated with *A. serratus*. The major pharmacological activities reported to date are discussed below.

1. **Anti-ulcerogenic and gastroprotective activity**: The anti-ulcerogenic activity of *A. serratus* is one of its most significant pharmacological properties. Dharmani et al., (2005) demonstrated that extracts of the plant exhibited marked protection against experimentally induced gastric ulcers. The gastroprotective effect is believed to involve enhancement of mucosal defence mechanisms, reduction of gastric acidity and antioxidant-mediated protection of gastric tissues. These findings validate its traditional use in treating stomach ulcers and related gastrointestinal disorders.
2. **Antibacterial activity:** Antibacterial studies have shown that *A. serratus* possesses broad-spectrum antimicrobial activity. Chavan and Gaikwad, (2013) reported significant inhibition of pathogenic bacterial strains, supporting its ethnomedicinal application in treating infections and diarrhoeal conditions. The antibacterial activity may be attributed to the presence of phenolics and flavonoids that disrupt microbial cell membranes and metabolic pathways.
3. **Anti-inflammatory activity:** Inflammation is a common underlying factor in ulcers, infections and chronic diseases. *A. serratus* has been traditionally used as an anti-inflammatory agent and its efficacy has been documented in classical medicinal literature (Asolkar et al., 1992). The anti-inflammatory action likely contributes to its effectiveness in treating elephantiasis, ulcers and bone-related disorders.
4. **Antioxidant activity:** Oxidative stress plays a crucial role in the progression of inflammatory and degenerative diseases. Radhaiah et al., (2019) demonstrated strong antioxidant activity in aqueous fruit extracts of *A. serratus*. The antioxidant potential is associated with the presence of bioactive phytochemicals capable of scavenging free radicals and protecting cellular components from oxidative damage.

5. **Anti-osteoporotic and bone-healing effects:** Recent pharmacological investigations have revealed the anti-osteoporotic potential of *A. serratus*. Yadav et al., (2024) reported its effectiveness in improving bone health and supporting fracture healing. These findings correlate with its traditional use in bone fractures and suggest a role in regulating bone metabolism and mineralization. Similar phytochemical profiles reported by Boligon et al., (2009) further support these observations.
6. **Phytochemical basis of therapeutic activity**: Phytochemical analyses of *A. serratus* have revealed the presence of diverse bioactive compounds, including flavonoids, phenolic compounds, tannins and other secondary metabolites. Priya et al., (2012) reported phytochemical constituents through UV and GC-MS analysis, highlighting compounds that may be responsible for its antioxidant, anti-inflammatory and antimicrobial activities. The synergistic interaction of these phytochemicals likely contributes to the broad pharmacological profile of the plant.

Future prospects and research gaps

Despite promising experimental evidence, several research gaps remain. Future studies should focus on:

1. Isolation and structural characterization of active phytoconstituents.
2. Elucidation of molecular mechanisms underlying pharmacological effects.
3. Comprehensive toxicological and pharmacokinetic evaluations.
4. Clinical validation of traditional formulations.

Addressing these gaps may facilitate the development of standardized herbal medicines or lead compounds for novel drug discovery.

Conclusion

Allophylus serratus (Roxb.) Kurz is an important ethnomedicinal plant with a wide spectrum of pharmacological activities. Traditional claims related to ulcers, inflammation, gastrointestinal disorders, infections and bone ailments are strongly supported by scientific studies. The plant's anti-ulcerogenic, antibacterial, antioxidant, anti-inflammatory and anti-osteoporotic properties highlight its therapeutic potential. Continued interdisciplinary research integrating ethnomedicine, phytochemistry and pharmacology may further establish *A. serratus* as a valuable natural resource for future medicinal applications.

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