Review Article

Holarrhena pubescens Wall. ex G. Don: a medicinal tree species of Odisha, India

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Abstract

Holarrhena pubescens Wall. ex G. Don is a well-known ethnomedicinal tree widely distributed in tropical regions of India, particularly in Odisha. Traditionally recognized for its therapeutic applications, this plant has been extensively used in indigenous systems of medicine to treat gastrointestinal disorders, parasitic infections and metabolic diseases. The present review compiles available information on the medicinal uses of different plant parts, including bark, roots, seeds and stem, based on published literature. The bark is prominently used for treating diarrhoea and dysentery, while seeds and roots exhibit antidiabetic and antimalarial properties. Scientific studies further validate its pharmacological activities, such as antioxidant, hypoglycaemic and anthelminthic effects. This review highlights the therapeutic significance of *H. pubescens* and emphasizes its potential for future pharmacological research and drug development.

Keywords: *Holarrhena pubescens*, ethnomedicine, Odisha, medicinal plants, pharmacological activity

Introduction

Medicinal plants have been an integral part of traditional healthcare systems in India for centuries, providing affordable and effective remedies for various ailments (Pradhan et al., 2025). The state of Odisha, with its rich biodiversity and tribal heritage, possesses a vast repository of ethnomedicinal knowledge (Kumar et al., 2013). Indigenous communities rely heavily on forest resources for primary healthcare, utilizing various plant species for treating diseases ranging from minor infections to chronic disorders (Rahman et al., 2022). Among these valuable medicinal plants, *Holarrhena pubescens* holds a prominent position due to its wide range of therapeutic applications. It belongs to the family Apocynaceae and is commonly found in dry deciduous forests across India (Pawar et al., 2024). The plant has been extensively used in Ayurveda and folk medicine, particularly for treating gastrointestinal disorders such as diarrhoea and dysentery (Jamadagni et al., 2017). In recent years, increasing scientific interest has been directed toward validating the traditional uses of *H. pubescens*. Several studies have reported its diverse

pharmacological properties, including antidiabetic, antioxidant, antimicrobial and anti-helminthic activities (Saha et al., 2023).

Figure 1: Author collected plant parts of *Holarrhena pubescens* for morphological study

These findings support its traditional applications and highlight its potential as a source of bioactive compounds for modern medicine.

Methodology

This review is based on a comprehensive analysis of the published scientific literature on *Holarrhena pubescens*. Relevant data were collected from peer-reviewed journals, including studies by Zahara et al. (2020), Alyahya et al. (2023), Bhusal et al. (2014), Saha et al. (2023) and Tiwari et al. (2024). The information was systematically organized to highlight the medicinal uses of different plant parts and their pharmacological properties (Jena et al., 2025; Kumar, 2025; Sahu et al., 2026). Emphasis was placed on ethnomedicinal uses reported from India, particularly Odisha, along with experimental validation from recent studies. Photographs are collected from Rairangpur, Mayurbhanj, Odisha.

Results and discussion

The compiled data indicate that *Holarrhena pubescens* (Figure 1; Plate 1) possesses significant medicinal value, with different plant parts exhibiting distinct therapeutic properties (Table 1). The bark is the most extensively used part and is traditionally employed in the treatment of diarrhoea and amoebic dysentery. Scientific studies further confirm its antioxidant, hypoglycaemic and anti-diarrheal activities, supporting its widespread use in gastrointestinal disorders. Other plant parts also contribute to its medicinal importance. Roots are traditionally used to treat malaria, while seeds are used to manage fever, helminthic infections and diabetes. The stem is used for relieving toothache. The presence of multiple pharmacological activities across different plant parts suggests that *H. pubescens* is a versatile medicinal species with broad therapeutic potential.

Table 1: Medicinal uses of *Holarrhena pubescens* Wall. ex G.Don

Plant parts	Medicinal Uses	Source(s)
Bark	Bark decoction is used to cure diarrhoea.	Zahara et al., (2020)
	Bark powder is used to cure amoebic dysentery.	Zahara et al., (2020)
	Bark has antioxidant activity.	Bhusal et al., (2014)
	Hypoglycaemic action	Saha et al., (2023)
	Anti-diarrheal activity	Tiwari et al., (2024)
Roots	Roots are used to treat malaria.	Zahara et al., (2020)
Seeds	Seed powder is used to treat low fever.	Zahara et al., (2020)
	Seed infusion is used as anti-helminthiasis agent.	Zahara et al., (2020)
	Seeds powder has antidiabetic activity.	Alyahya et al., (2023)
Stem	Stem is used to cure toothache.	Zahara et al., (2020)

Plate 1: Plant parts of *Holarrhena pubescens,* A) Leaves & Flowers, B) Flowers, C) Fruits and D) Bark

The traditional uses of *H. pubescens* are strongly supported by modern pharmacological studies, demonstrating a close correlation between ethnomedicinal knowledge and scientific validation. Its effectiveness in treating gastrointestinal disorders, particularly diarrhoea and dysentery, can be attributed to its antimicrobial and anti-diarrheal properties. The presence of bioactive compounds such as alkaloids likely plays a crucial role in these therapeutic effects. Furthermore, the antidiabetic and antioxidant properties of the plant highlight its potential in managing metabolic disorders. The seed extracts, in particular, have shown promising results in regulating blood glucose levels through multiple mechanisms. Additionally, its anti-helminthic activity indicates its usefulness in controlling parasitic infections, which are common in rural and tribal regions. Despite its extensive traditional use, there is still a need for detailed phytochemical analysis, clinical trials and toxicity studies to ensure its safe and effective use. Future research should focus on isolating active compounds and exploring their mechanisms of action to facilitate the development of novel plant-based drugs.

Conclusion

H. pubescens is an important medicinal tree species with significant ethnomedicinal and pharmacological value. Its diverse therapeutic properties, particularly in treating gastrointestinal and metabolic disorders, make it a valuable resource for traditional and modern medicine. The integration of traditional knowledge with scientific research can further enhance its potential for drug discovery and healthcare applications.

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