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Review Article

Therapeutic potential of medicinal climber *Abrus precatorius* L. (Fabaceae)

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Abstract: *Abrus precatorius* L. (Fabaceae), commonly referred to as rosary pea or jequirity bean, is a perennial medicinal climber widely distributed throughout tropical and subtropical regions. The plant has long been utilized in traditional medical systems for the management of numerous ailments, with different parts such as leaves, roots and seeds exhibiting distinct therapeutic applications. Beyond its medicinal relevance, the seeds of *A. precatorius* are historically notable for their remarkably uniform weight (approximately 0.1 g), which has been traditionally employed as a standard unit of measurement. In recent decades, increasing scientific attention has been directed toward validating its ethnomedicinal claims, resulting in the identification of diverse pharmacological activities, including anti-diabetic, anti-inflammatory, antimicrobial, neuroprotective, immunomodulatory and anticancer effects. Nevertheless, the presence of potent toxic constituents, particularly abrin in the seeds, raises significant safety concerns. Present study critically synthesizes available literature on the traditional uses, pharmacological properties and toxicity of *A. precatorius*, highlighting recent experimental advances while identifying key research gaps that must be addressed to facilitate its safe and effective therapeutic development.

Keywords: Fabaceae, medicinal climber, ethnomedicine, pharmacological activities, toxicity

Introduction

Medicinal plants continue to constitute an indispensable component of global healthcare, particularly in developing regions where traditional medicine remains deeply embedded in cultural practices (Mbuni et al., 2020). Climbers and lianas are of particular interest due to their rich phytochemical diversity and adaptive secondary metabolism (Wang and Zhang, 2025). Among these, *Abrus precatorius* L. (Figure 1), a twining perennial climber belonging to the family Fabaceae, occupies a prominent position in ethnomedicine (Nayak and Kumar, 2023). Morphologically, *A. precatorius* is characterized by pinnate leaves, small papilionaceous flowers, and striking red-and-black seeds. The seeds are especially noteworthy for their consistent mass of approximately one-tenth of a gram, a property that historically enabled their use as a traditional weighing unit in trade and medicine (Garaniya and Bapodra, 2014). Despite its extensive medicinal use, *A. precatorius* is also recognized for its toxicity, primarily due to abrin, a highly potent ribosome-inactivating protein concentrated in the seeds (Tam et al., 2017). Traditional medical systems emphasize careful processing, detoxification and dose regulation to minimize adverse effects. The expanding interest in plant-derived drugs, a critical and updated appraisal of the therapeutic potential and safety profile of *A. precatorius* is both timely and necessary.

Methodology

A comprehensive literature survey was conducted to collect and critically evaluate existing knowledge on *Abrus precatorius*. Multiple electronic databases, including Scopus, Web of Science, PubMed, SciFinder and Google Scholar, were systematically searched. The search strategy employed combinations of the keywords "*Abrus precatorius*", "ethnobotany", "traditional medicine", "medicinal uses" and "pharmacological activities." Only peer-reviewed articles, authoritative reviews and ethnobotanical reports published in English were included. Data were screened for relevance, with particular emphasis on plant-part-specific uses, experimentally validated pharmacological activities and toxicity-related findings (Qian et al., 2022; Kumar, 2025).

Ethnobotanical and traditional uses

Traditional knowledge provides a critical foundation for pharmacological discovery. In the case of *A. precatorius*, different plant parts are employed in diverse ethnomedicinal contexts, reflecting a broad therapeutic spectrum (Table 1).

Leaves: The leaves of *A. precatorius* are widely utilized in folk medicine for the treatment of febrile conditions, cough and common cold (Garaniya and Bapodra, 2014). Ethnobotanical surveys further document their use in inflammatory disorders, including arthritis, rheumatism, swellings and other musculoskeletal ailments (Vijayan and Margesan, 2025). In several traditional systems, leaf preparations are regarded as nerve tonics and are also prescribed for the management of diabetes mellitus (Okhale and Nwanosike, 2016; Boye et al., 2021).

Roots: Roots of *A. precatorius* are attributed with strong medicinal value in traditional practice. Chewing of root pieces has been reported as an emergency remedy for snakebite (Garaniya and Bapodra, 2014).

Figure 1: Plant parts of *A. precatorius*, a) habitat, b) leaves, c) flowers and fruits and d) seeds

Additionally, root-based formulations are employed in the treatment of jaundice, haemoglobinuric bile and abdominal pain. Decoctions prepared from the roots are traditionally administered for respiratory

and hepatic disorders such as bronchitis and hepatitis, while their use in the management of gonorrhoea has also been recorded (Garaniya and Bapodra, 2014; Okhale and Nwanosike, 2016).

Seeds: The seeds represent the most pharmacologically potent yet toxic part of the plant. Traditionally, processed seeds are used as anthelmintics to treat worm infestations and as oral contraceptives in certain indigenous practices (Garaniya and Bapodra, 2014). Topical and external applications of detoxified seed preparations have also been reported for promoting hair growth (Okhale and Nwanosike, 2016). Owing to their high toxicity, seed-based remedies are generally employed under strict traditional guidelines.

Table 1: Medicinal uses of *A. precatorius*

Plant parts	**Uses**	**Source**
Leaves	Used to cure fever, cough and cold.	Garaniya and Bapodra, (2014)
	Used in arthritis.	Vijayan and Margesan, (2025)
	Used in swellings, rheumatism and other musculoskeletal disorders.	Vijayan and Margesan, (2025)
	Used as a nerve tonic.	Okhale and Nwanosike, (2016)
	Good for diabetes.	Boye et al., (2021)
Roots	Chewed as a snake bite remedy.	Garaniya and Bapodra, (2014)
	Used to treat jaundice and haemoglobinuric bile.	Garaniya and Bapodra, (2014)
	Paste is used to cure abdominal pain.	Garaniya and Bapodra, (2014)
	Decoction is used to treat bronchitis and hepatitis.	Garaniya and Bapodra, (2014)
	Used in gonorrhoea.	Okhale and Nwanosike, (2016)
Seeds	Used to cure worm infection.	Garaniya and Bapodra, (2014)
	Used as oral contraceptives.	Garaniya and Bapodra, (2014)
	Used to promote hair growth.	Okhale and Nwanosike, (2016)

Pharmacological activities

Extensive pharmacological investigations have revealed that *A. precatorius* exhibits a remarkably wide range of biological activities. Reported effects include abortifacient, analgesic, anti-allergic, anti-arthritic, anti-asthmatic, anticancer, anti-cataract, anticonvulsant, antidepressant, antidiabetic, antiepileptic, anti-estrogenic, antifertility, anthelmintic, anti-implantation, anti-inflammatory, anti-insecticidal, antimalarial, antimicrobial, antioxidant, antiserotonergic, antispermogenic, antitoxic, antiviral, antiyeast, diuretic, immunomodulatory, memory-enhancing, neuromuscular and neuroprotective activities (Adelowotan et al., 2008; Garaniya and Bapodra, 2014; Okhale and Nwanosike, 2016; Gautam, 2017; Boye et al., 2021; Qian et al., 2022; Vijayan and Margesan, 2025). Among these, the antidiabetic potential of leaf extracts

has received substantial experimental support. Studies demonstrate that *A. precatorius* leaf extract can significantly modulate insulin, glucagon and glucagon-like peptide-1 levels, as well as inhibit key carbohydrate-metabolizing enzymes such as α-amylase and α-glucosidase (Boye et al., 2021). Antimicrobial activity against clinically relevant pathogens further substantiates its traditional use in infectious conditions (Adelowotan et al., 2008). Recent computational and LC-MS-based analyses suggest that specific phytoconstituents in the leaves may interact with inflammatory targets, providing mechanistic insights into their anti-arthritic effects (Vijayan and Margesan, 2025).

Toxicity and safety considerations

Notwithstanding its therapeutic promise, *A. precatorius* poses significant toxicological concerns. The primary toxic principle, abrin, is a highly potent lectin that inhibits protein synthesis by inactivating ribosomes, leading to severe cellular damage. Accidental or improper ingestion of seeds can be fatal. Traditional medicinal systems emphasize detoxification procedures and precise dosing to mitigate toxicity; however, these practices are not always standardized. From a modern pharmacological perspective, rigorous toxicological evaluation, dose optimization and safety profiling are essential prerequisites for the clinical translation of *A. precatorius*-based formulations (Gautam, 2017; Qian et al., 2022).

Research gaps and future perspectives

Despite extensive ethnobotanical documentation and growing experimental evidence, several critical research gaps remain. Most pharmacological studies are limited to *in vitro* assays or animal models, with a notable lack of well-designed clinical trials. Furthermore, comprehensive phytochemical standardization, identification of bioactive lead compounds and detailed mechanistic studies are insufficient. Comparative evaluations of different plant parts with respect to efficacy and safety are scarce and long-term toxicity studies are largely absent. Addressing these gaps through interdisciplinary research integrating ethnomedicine, phytochemistry, pharmacology and clinical sciences will be crucial for the rational development of safe and effective therapeutics from *A. precatorius*.

Conclusion

Abrus precatorius L. represents a medicinally valuable climber with a long-standing history of traditional use and a broad spectrum of experimentally validated pharmacological activities. Accumulating evidence supports its potential in the management of metabolic, inflammatory, infectious and neurological disorders. However, the inherent toxicity of certain plant parts, particularly the seeds, necessitates cautious and scientifically rigorous evaluation. Future research focusing on standardization, safety assessment and clinical validation will be essential to fully harness the therapeutic potential of *A. precatorius* while ensuring patient safety.

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