
Research Article

Exploring the therapeutic potential of *Alocasia macrorrhizos*: a comprehensive review

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Abstract: *Alocasia macrorrhizos*, commonly known as Giant Taro, is a large, evergreen herbaceous plant of significant ethnobotanical and pharmacological importance. For centuries, it has been utilized in various cultures to treat a range of ailments, including wounds, skin infections, rheumatism, and digestive disorders. The plant's bioactive compounds, such as flavonoids, alkaloids, tannins, phenolic compounds, and saponins, contribute to its antimicrobial, anti-inflammatory, antioxidant, and potential anticancer properties. However, the presence of calcium oxalate crystals necessitates proper processing to mitigate toxicity risks. This review aims to summarize the traditional uses and pharmacological potential of *A. macrorrhizos*, underscoring the need for further scientific investigation through pharmacological and clinical studies to fully harness its therapeutic potential.

Keywords: Araceae, *Alocasia*, medicinal uses, pharmacological potential

Introduction

The *Alocasia* genus belongs to the Araceae family, which consists of 107 genera and over 3,700 species distributed worldwide. They are native to tropical and subtropical Asia, extending from the Himalayas to Oceania (Muller and Guzzon, 2024). The genus is closely related to *Colocasia*, often leading to confusion between the two genus. The *Alocasia* genus primarily comprises tropical plants

with large and showy leaves. Some *Alocasia* species, such as *A. cucullata* (Chinese taro) and *A. macrorrhizos* (Giant taro), are cultivated for their tubers and leaves, used as food, fodder, and medicinal ingredients (Joshi et al., 2015). The genus is also valued for its ornamental plants, which have high commercial demand. Various species have been used in traditional medicine across tropical regions. *A. macrorrhizos*, commonly known as Elephant's Ear, is a tall, succulent herbaceous plant reaching up to 4.5 meters. It features large, arrow-shaped leaves with a conspicuous midrib and nearly peltate structure. The well-developed caudex supports the plant, which is widely used as a household decorative plant and for its medicinal properties (Badhe et al., 2022). The most commonly used part of *A. macrorrhizos* is its tuber, which contains alomacrorrhiza and allocasin. The detoxified tuber is used in traditional medicine to treat influenza, high fever, malaria, diarrhea, typhoid fever, rheumatic conditions, pulmonary tuberculosis, headaches, abscesses, ringworms, venomous bites, leukorrhea, and severe burns (Banik et al. 2014; Singh et al., 2019). The rootstock has mild laxative and diuretic properties and treats inflammation and abdominal diseases. Additionally, the leaves have been applied as an astringent, anti-tumor agent, and rubefacient for skin conditions, rheumatic pains, and wound healing. Various phytochemicals, including flavonoids and phenolic compounds, have been identified in *Alocasia* species, supporting their antioxidant and anti-tumor properties (Arbain et al., 2022; Muller and Guzzon, 2024). In vitro and in vivo studies have demonstrated their cytotoxic, anti-inflammatory, and antimicrobial activities, highlighting their potential for pharmaceutical applications (Singh et al., 2019). The *Alocasia* genus, particularly *A. macrorrhizos*, has significant medicinal, agricultural, and ornamental value. Its traditional uses and phytochemical properties provide a strong basis for further pharmacological research. Given its widespread distribution and ethnobotanical relevance, future studies should focus on drug discovery and sustainable cultivation methods to enhance its economic and medicinal potential.

Morphology

A. macrorrhizos is a large, perennial, evergreen herb belonging to the family Araceae. It grows up to 3-5 meters tall and has a thick, tuberous rhizome that aids in vegetative propagation. The plant is characterized by its enormous, glossy green, arrow-shaped leaves with prominent veins, reaching up to 1–2 meters in length. It produces a typical araceous inflorescence, with a spadix partially enclosed by a pale green spathe. The flowers are unisexual, with female flowers at the base, male flowers above, and sterile flowers in between. Its fruit is a small, reddish berry containing seeds dispersed by birds and water. The plant thrives in tropical climates and is often grown as an ornamental due to its striking foliage (Garcia et al., 2008; Daawia et al., 2024; Figure 1).

Traditional medicinal uses

A. macrorrhizos has been widely used in traditional medicine across various cultures for its therapeutic properties. The rhizome is commonly applied as a poultice to treat wounds, boils, and skin infections due to its anti-inflammatory and antimicrobial effects (Arbain et al., 2022). In Ayurvedic and Southeast Asian medicine, extracts from the rhizome are used to relieve rheumatism, joint pain, and swelling. The sap of the plant is sometimes applied to insect bites and stings to reduce irritation. In some indigenous

practices, the cooked rhizome is consumed in small amounts to treat digestive disorders and enhance appetite (Present study; Figure 1). Additionally, the leaves are occasionally used in poultices to reduce fever and promote healing (Banik et al., 2014; Singh et al., 2014).



Figure 1: Collection of ethnomedicinal uses from field

Pharmacological potential

A. macrorrhizos possesses significant pharmacological potential due to its diverse bioactive compounds, including flavonoids, alkaloids, tannins, phenolic compounds, and saponins. Studies have

shown that extracts from the rhizome exhibit antimicrobial and antifungal properties, making it useful in treating infections (Banik et al., 2014; Singh et al., 2014). Its anti-inflammatory and analgesic effects support traditional uses for pain relief in conditions like arthritis and rheumatism. The plant also demonstrates antioxidant activity, which may help combat oxidative stress-related diseases (Daawia et al., 2024). Additionally, research suggests potential anticancer properties due to the presence of bioactive compounds that inhibit tumor cell proliferation. The wound-healing ability of *A. macrorrhizos* has been attributed to its antimicrobial and tissue-regenerating effects. Further pharmacological studies and clinical trials are needed to explore its full therapeutic potential (Muller and Guzzon, 2024).

Conclusion

A. macrorrhizos is a valuable medicinal plant with a long history of traditional use and significant pharmacological potential. Its bioactive compounds exhibit promising antimicrobial, anti-inflammatory, antioxidant, and possibly anticancer properties. While traditional applications suggest its therapeutic benefits, further scientific research, including pharmacological studies and clinical trials, is necessary to establish its efficacy and safety for modern medicinal applications. The exploration of its bioactive compounds could lead to the development of novel natural drugs, making *A. macrorrhizos* a potential species for future pharmaceutical research.

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