

A Brief Review on Medicinal Properties of Ipomoea Palmata (L.)

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Abstract—A renowned botanical resource in conventional medical systems is *Ipomoea palmata*, a member of the Convolvulaceae family, which is prized for its wide range of pharmacological actions. Convolvulaceae species are well known for their medicinal potential, especially in light of their historical influence on the functioning of the central nervous system. In addition to its neurological uses, the herb is widely used in traditional medicine to treat many general systemic illnesses, skin issues, and inflammatory conditions. A rich profile of bioactive components, such as alkaloids and flavonoids, which contribute to the plant's wider pharmacological activity, supports its use in treating certain health issues. Scientific study into these secondary metabolites continues to corroborate the plant's ethnomedicinal usefulness, establishing a basis for creating innovative therapeutic approaches. Current research highlights the importance of defining these pharmaceutical applications via extensive phytochemical screening to assure therapeutic uniformity and safety. This species, defined by its characteristic palmate leaf and climbing habit, retains a vital component among native pharmaceuticals owing to its versatility and vast variety of medicinal uses. By blending traditional knowledge with current pharmacological research, *I. palmata* provides as a prospective topic for finding bioactive compounds capable of treating varied chronic health disorders.

Index Terms—Medicinal property of *Ipomoea palmata*, review, pharmacological properties etc.

I. INTRODUCTION

Ipomoea palmata, an important plant of the Convolvulaceae family, has long been acknowledged for its numerous ethnomedicinal uses throughout many tropical and subtropical climates (Meira et al., 2012). Species of the *Ipomoea* genus are widely regarded in conventional medical literature for their bioactive components, which are increasingly

investigated for their anti-inflammatory, antioxidant, and antibacterial capabilities (Borlongan et al., 2024). This plant species serves as a key resource in traditional healthcare systems, where its varied parts are widely employed to manage inflammatory diseases and a variety of physiological ailments. Contemporary phytochemical investigations have also discovered the existence of secondary metabolites, such as alkaloids and flavonoids, which underlie the plant's efficiency in healing localized infections and chronic metabolic illnesses.

Ongoing pharmacological research attempts to legitimise these ancestral traditions by developing a scientific basis for the plant's medicinal utility in controlling systemic diseases. Such initiatives are especially critical for standardizing the dose and extraction procedures required to transform traditional ethnobotanical knowledge into practical pharmaceutical therapies. Furthermore, recent research into the aerial components of similar Convolvulaceae species have established a sound scientific framework for assessing the analgesic and therapeutic effects of *Ipomoea* derivatives in vivo (Ambika & Nair, 2018).

Consequently, defining the particular phytochemical profiles of *I. palmata* remains a significant priority for researchers attempting to identify bioactive chemicals, drawing upon known features of similar species like *I. carnea* (Bhalerao & Teli, 2016). Establishing these associations is vital for increasing the incorporation of *I. palmata* into evidence-based treatment procedures for dermatological and systemic diseases. Given the taxonomic closeness of this plant to other therapeutically relevant Convolvulaceae members, further investigation of its chemical contents is likely to offer potential paths for current clinical uses (Naphade & Gupta, 2024).

This research is especially relevant considering that traditional healing practices generally emphasise such botanicals for the therapy of chronic inflammatory conditions (Viljoen et al., 2012). In particular, a complex array of secondary metabolites, such as alkaloids, terpenoids, and glycosides, that exhibit notable therapeutic efficacy against a variety of pathologies, from rheumatism to microbial infections, are responsible for this genus' pharmacological potential (Ameamsri et al., 2021). The continuing interest in these secondary metabolites emphasises their potential to serve as predecessors for the creation of innovative, plant-derived therapeutic agents in current medicine (Arora et al., 2024; Wani & Upadhyay, 2026). To this purpose, contemporary research efforts are increasingly focused on combining traditional ethnobotanical knowledge with empirical laboratory evaluations to assure both the safety and effectiveness of these botanical preparations (Cabrera-Morales et al., 2026; Nurmaula, 2024).

Such integrative investigations serve as a key store of information, bridging the gap between historical therapeutic practices and the stringent standards of current pharmacological validation (Dapar et al., 2020). By thoroughly identifying these bioactive compounds, researchers may further explain the processes via which the Convolvulaceae family tackles drug-resistant diseases and metabolic abnormalities (Ambika & Nair, 2018). This methodical approach matches known techniques used to examine the pharmacological properties of related species, such as *Ipomoea staphylina*, which is well documented for its effectiveness against oxidative stress and inflammatory diseases (Kokila & Jeevan, 2021). Building upon this basis, the categorisation of *I. palmata* within the Convolvulaceae family shows a comparable range of phytochemical variety typically exploited in ethnobotanical systems for its purgative and anthelmintic properties (Niranjan & Prabhurajeshwar, 2020).

According to Nahar et al. (2020), the plant's therapeutic adaptability highlights its potential as a strong source of alternative medication candidates that may mitigate systemic difficulties including oxidative stress and other microbial issues. Moreover, the chemical profile of such species is often characterized by significant quantities of flavonoids and tannins, which are essential to their defensive and therapeutic usefulness (Mata et al., 2025). Beyond these structural

components, *Ipomoea* species' presence of particular bioactive compounds frequently correlates with notable anthelmintic and cytotoxic activities, providing a foundation for their therapeutic usefulness in treating cellular and parasitic diseases (Hossain et al., 2024; Sánchez-Hernández et al., 2025).

II. LITERATURE REVIEW

According to botanical research, *I. palmata* is a trailing vine distinguished by its palmate leaves, a feature that is often connected to traditional uses in the treatment of gastrointestinal issues and localised swelling (Meira et al., 2012). To treat internal inflammatory indicators, these traditional medicines usually entail applying macerated leaves topically or administering aqueous extracts. These ethnobotanical claims have been supported by recent pharmacological studies of similar species in the Convolvulaceae family, which show the presence of bioactive secondary metabolites like terpenoids and flavonoids that promote analgesic and anti-inflammatory responses (Akinniyi et al., 2022).

A substantial, dose-dependent suppression of inflammatory markers has been shown in experimental models evaluating aqueous extracts from related congeners, providing a molecular foundation for their traditional usage (Lawal et al., 2010). Additionally, initial *in vitro* evaluations indicate that these phytochemical components might suppress pro-inflammatory mediators, which is consistent with the effectiveness seen in related species that use fractions rich in alkaloids to regulate pain pathways and tissue-level reactions (Jegade et al., 2009; Xavier-Santos et al., 2022).

According to another research, *Ipomoea* species' purgative effect may be attributed to the presence of glycosidic acid complexes, which supports the plant's traditional use in gastrointestinal medicine (Aggarwal et al., 2011). Further supporting the genus's diverse medicinal profile is the observed presence of phenolic chemicals in these extracts, which highlights their potential for systemic antioxidant and antibacterial activity (Harshitha & Xavier, 2025; Qneibi et al., 2026). A potential path toward the development of standardised, evidence-based botanical medicines is provided by these studies into the synergistic effects of such secondary metabolites (Arman et al., 2024; Balkrishna et al., 2024). In particular, comparative studies of *Ipomoea* extracts have shown strong

antibacterial activity, with leaf derivatives showing inhibitory effects against a range of Gram-positive and Gram-negative pathogens (Frey & Meyers, 2010).

According to mechanistic understanding, these phytochemical fractions cause bacterial membrane permeability to be disrupted, which eventually results in intracellular component depletion and cell death (Suhendy et al., 2023). Additionally, data from comparable species indicates that by reducing oxidative damage in biological systems, these secondary metabolites support hepatoprotective and nephroprotective actions (Kumar & Basak, 2024). These pharmacological profiles are consistent with clinical results seen in species such as *I. batatas*, where the interaction of phytochemical components promotes a variety of functions, including immunostimulation and wound healing (Hao et al., 2025).

Similar to this, studies on the species' phytochemical components reveal the presence of alkaloids and saponins, which are crucial for controlling microbial development and provide systemic protection (Fatima et al., 2014; Yuvarani & Selvam, 2018). Consequently, the pharmacological research of *I. palmata* remains a crucial topic of inquiry, since its phytochemical profile likely reflects the numerous therapeutic effects reported in its taxonomically similar counterparts (Sharma, 2026). To ensure the dependability of their therapeutic uses, future clinical research must give priority to standardising these extracts in order to overcome differences in metabolite concentration (H., 2025). Flavonoids and resin glycosides are among the complex secondary metabolite profiles that underlie the various medicinal potential of *Ipomoea* species, according to ongoing research into their chemical composition (Ravikumara et al., 2025).

III. METHODOLOGY

In order to find relevant peer-reviewed papers, a literature search was carried out using keywords like "Ipomoea palmata," "ethnomedicine," "phytochemistry," and "pharmacological activity" across scientific databases including PubMed, Scopus, and Science Direct. Only English-language, peer-reviewed studies that addressed the species' identification, pharmacological screening, and validation by clinical testing fulfilled the inclusion

criteria. Duplicate entries, comparative studies with conflicting data, and publications without valid taxonomic identification were not included in this evaluation. To ensure a thorough assessment of the genus, the scope of this research also includes pharmacopoeias, verified ethnomedicinal surveys, and classical botanical literature. In contrast to more well researched congeners, there are still few original papers describing the precise phytochemical isolation of this taxon, which limits the evidence despite these strict selection criteria. As a result, this analysis summarises the information that is currently available while recognising that the direct comparison of reported biological activities may be limited by differences in extraction methods and the geographic origin of plant samples (Bieski et al., 2015; Rengasamy et al., 2020).

IV. RESULTS

There is a contradiction between reported traditional practices and laboratory-validated bioactivities in the pharmacological data for *I. palmata*. While contemporary laboratory evaluations, especially those employing chloroform and ethanol extractions, have demonstrated significant inhibitory effect against carrageenan-induced paw oedema in rodent models, traditional use reports often highlight the topical efficacy of leaf extracts for managing localised inflammatory swellings (Maraña et al., 2021). Additionally, in vitro studies have shown the effectiveness of these extracts against a range of pathogenic bacterial and fungal strains, whereas traditional knowledge emphasises the use of the plant for alleviating gastrointestinal pain (Geck et al., 2020). These results imply that laboratory assays offer a mechanistic basis for these clinical outcomes by isolating the bioactive components responsible for antimicrobial and anti-inflammatory pathways, whereas traditional medicine mainly focuses on symptom management through crude preparations (Khakurel et al., 2022; Okpako et al., 2023). The gap between past anecdotal success and the need for standardised chemical profiling is filled by such experimental validation (Das & Nath, 2026; Jiang et al., 2026). Practitioners should be aware, nevertheless, that despite these encouraging bioassays, thorough clinical studies are required by contemporary scientific standards in order to conclusively determine

the long-term effectiveness and human safety of these traditional treatments (Clément et al., 2015). Since proven pharmacological standards are crucial for incorporating such herbal treatments into primary healthcare systems, future research should focus on standardising these extracts to establish accurate dose thresholds and probable toxicity levels (Ssenku et al., 2022). For indigenous botanical knowledge to be transformed into trustworthy therapeutic solutions, this baseline must be established via controlled investigations (Wang et al., 2025). Additionally, since the quantity of bioactive secondary metabolites varies greatly across various tissues, characterising certain plant parts typically roots and leaves is essential (D'Almeida et al., 2024). Because the medicinal effectiveness of extracts often relies on the precise concentration of bioactive substances localised inside stems, leaves, or roots, comparative studies on the chemical makeup of various plant parts are essential (Tucay et al., 2025).

According to Mottaghipisheh et al. (2024) and Shamim et al. (2026), such sophisticated profiling is still a crucial condition for reducing the hazards associated with phytochemical content fluctuation and guaranteeing the creation of safe, repeatable medical applications. Furthermore, pharmacokinetic constraints including bioavailability and quick metabolic clearance must be addressed in future research as they often make it difficult to convert in vitro findings into useful in vivo results (Imran et al., 2026; Leonti & Casu, 2013). To close existing information gaps and guarantee therapeutic safety, these studies must be expanded to incorporate human cell-line tests and longterm toxicity screens (Plaatjie et al., 2024). To improve the accuracy of future pharmacological applications, it will be crucial to include systematic bio-guided fractionation in order to separate the specific active chemicals that are responsible for these noted therapeutic effects (Chassagne et al., 2021; Shuid et al., 2026).

V. DISCUSSION

According to Ncube et al. (2008), the present collection of scientific evidence for *Ipomoea palmata* is still mainly preliminary and is marked by a lack of standardised extraction protocols and a frequent inability to determine clear correlations between particular bioactive constituents and reported

antimicrobial outcomes. Larger, carefully monitored clinical studies are thus required to ascertain the long-term safety characteristics and therapeutic capacity of this species since the dependence on varied experimental approaches restricts the potential for scaling of these results (B et al., 2026). To reduce any health concerns and legitimise the therapeutic use of *I. palmata*, it is also crucial to overcome these methodological discrepancies by stringent pharmacological screening and standardised toxicological tests (Iyambo et al., 2017; Moreno et al., 2026). Future research must prioritise sub-acute and chronic toxicity screens in addition to thorough pharmacokinetic profile in order to guarantee consumer safety, given the dependence on acute models (Dagne et al., 2026).

The identification and quantification of the specific phytochemical markers responsible for the observed biological activities will depend on the integration of sophisticated analytical methods, such as liquid chromatography-tandem mass spectrometry (LC-MS/MS) (Gad et al., 2017; Kabbashi et al., 2026). In order to determine the plant's therapeutic window and guarantee that upcoming clinical applications are backed by a thorough evaluation of both effectiveness and systemic safety, such thorough characterisation is essential (Ahmed et al., 2025; Vieira et al., 2024). Furthermore, when incorporating these botanical preparations into contemporary pharmaceutical regimens, it is crucial to look for possible herb-drug interactions to avoid negative outcomes (Chibueze et al., 2024).

Furthermore, investigating delivery methods based on nanotechnology may help address issues with low bioavailability and quick metabolic breakdown of active metabolites (Alhazmi et al., 2021). In order to assess systemic effectiveness and possible cumulative toxicities and make sure that therapy methods are safe and repeatable for clinical translation, robust in vivo models must be used (Ordóñez et al., 2024). In the end, these multidisciplinary research endeavours will be essential in surmounting the current clinical translation constraints (Mohammed et al., 2026; Solomon et al., 2025), enabling the shift from first pharmacological discoveries to evidence-based therapy guidelines. In order to eliminate variations in phytochemical profiles that currently impede the reproducibility of therapeutic results across different geographical populations, ongoing efforts to close

these data gaps must also address the standardisation of botanical material (Ding et al., 2025; Dougnon et al., 2022).

Furthermore, as the majority of present data are still restricted to animal models and lack solid human proof, future research must focus on developing standardised doses and clinical safety profiles (Choudhary et al., 2015; Walusansa et al., 2026). In order to confirm therapeutic claims and reduce possible systemic hazards, clinical and experimental research must prioritise thorough pharmacokinetic profiling and the separation of bioactive molecules (Bilal et al., 2023; Yousefsani et al., 2021). Furthermore, the establishment of universal procedures is required to guarantee constant therapeutic effectiveness since phytochemical profiles are inherently variable owing to environmental and regional variables (Heinrich et al., 2022).

VI. CONCLUSION

In conclusion, even though *Ipomoea palmata* has a great deal of pharmacological promise, the data that is now available is mostly limited to early in vitro and in vivo tests, underscoring the urgent need for standardized clinical validation. Finding the precise targets of its secondary metabolites and carrying out thorough dose-response studies must be the top priorities for future research in order to ease the shift from conventional applications to evidence-based pharmacological integration. Furthermore, thorough studies of the plant's pharmacokinetics and toxicity are necessary to provide the scientific groundwork needed for safe, sensible clinical use. The creation of standardized procedures required to allay regulatory worries and guarantee the effectiveness of herbal remedies in clinical settings will be made possible by addressing these research goals. To go beyond the species' subjective value and toward the development of safe, scientifically confirmed medicinal medicines, it is still essential to fill up these research gaps.

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