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A COMPREHENSIVE PHARMACOGNOSTIC REVIEW OF TABERNAEMONTANA DIVARICATA

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ABSTRACT

Tabernaemontana divaricata (L.) R.Br. ex Roem. & Schult. (family Apocynaceae), commonly known as crape jasmine or pinwheel flower, is an evergreen ornamental shrub widely distributed across South and Southeast Asia. The plant holds significant importance in traditional medicinal systems including Ayurveda, Siddha, and folk practices, with various parts being utilized for treating diverse ailments. This comprehensive review aims to consolidate current knowledge on the botanical characteristics, phytochemical composition, ethnomedicinal uses, pharmacological activities, and toxicity profile of *T. divaricata*, with particular emphasis on recent findings from 2020-2025. The plant is rich in bioactive phytoconstituents, particularly indole alkaloids (coronaridine, voacangine, tabersonine, conolidine), flavonoids (quercetin, kaempferol), terpenoids (ursolic acid, lupeol), and phenolic compounds. These constituents contribute to diverse pharmacological activities including anti-inflammatory, analgesic, antipyretic, antimicrobial, antioxidant, antidiabetic, wound-healing, and CNS-modulating effects. Recent investigations (2020-2025) further demonstrate its efficacy in reducing pain, inflammation, and fever in experimental models, with notable safety at high doses in toxicity studies. *T. divaricata* exhibits significant therapeutic potential supported by preclinical evidence. However, well-designed clinical studies remain limited. Future research should focus on clinical validation, structure-activity relationship studies, and development of standardized formulations.

Keywords: *Tabernaemontana divaricata*, Crape Jasmine, Apocynaceae, indole alkaloids, anti-inflammatory, antimicrobial, antioxidant, ethnomedicine

1. INTRODUCTION

Medicinal plants have formed the foundation of traditional healthcare systems for thousands of years and continue to play a vital role in modern drug discovery. According to the World Health Organization, nearly 80% of the global population depends on herbal medicines for primary healthcare, particularly in developing countries **[1]**. The increasing prevalence of antimicrobial resistance, chronic diseases, and adverse effects associated with synthetic drugs has intensified the search for safer and more effective bioactive compounds from natural sources **[2]**.

Tabernaemontana divaricata (L.) R.Br. ex Roem. & Schult., a member of the Apocynaceae family, is a perennial evergreen shrub widely distributed across South Asia, Southeast Asia, and parts of tropical Africa. In India, it holds considerable ethnomedicinal importance and is commonly known as Tagara in Sanskrit and Nandiyarvattai in Tamil **[3]**. The plant is well recognized for its attractive white, pinwheel-shaped flowers and is extensively cultivated as an ornamental species in gardens and temple premises, particularly in southern regions.

Beyond its ornamental value, *T. divaricata* is a rich source of diverse phytochemicals, especially indole alkaloids, which are known for their wide-ranging biological activities **[4]**. The leaves, roots, and flowers contain important constituents such as alkaloids, flavonoids, terpenoids, and phenolic compounds that contribute to its pharmacological potential. Experimental studies have demonstrated that leaf extracts exhibit anti-inflammatory, analgesic, antimicrobial, antioxidant, antipyretic, and wound-healing properties. Additionally, emerging research highlights its cytotoxic, anticancer, and central nervous system-modulating effects, further supporting its traditional uses in treating pain, fever, skin disorders, and infections **[5]**.

Despite promising preclinical findings, clinical evidence remains limited. Therefore, a comprehensive understanding of its phytochemistry and pharmacology is essential to bridge the gap between traditional knowledge and modern medicine. This review aims to compile and critically analyze available literature on *T. divaricata*, focusing on its taxonomy, botanical characteristics, distribution, phytochemical composition, ethnomedicinal uses, pharmacological activities, toxicity profile, and future pharmaceutical prospects, with particular emphasis on the leaves as the most biologically active component.

2. TAXONOMY AND BOTANICAL DESCRIPTION

2.1. Taxonomic Classification

Table 1: Taxonomy

Taxonomic Rank	Classification
Kingdom	Plantae
Division	Magnoliophyta (Angiosperms)
Class	Magnoliopsida (Dicotyledons)
Order	Gentianales
Family	Apocynaceae (Dogbane family)
Genus	*Tabernaemontana* L.
Species	*T. divaricata* (L.) R.Br. ex Roem. & Schult

Common names: Crape Jasmine (English), Pinwheel Flower, Chandni (Hindi), Tagar/Tagara (Sanskrit/Ayurveda), Nandiyarvattai (Tamil), Ananta (Bengali), Sugandhaphala (Kannada).

Chromosome number: 2n = 22.

Synonyms: *Ervatamia divaricata* (L.) Burkill; *Ervatamia coronaria* (Jacq.) Stapf; *Jasminum zeylanicum* L.; *Nerium coronarium* Jacq. **[5, 6]**.

2.2 Morphological Characteristics



Figure 1: ***Tabernaemontana divaricata*** **leaves**

The genus Tabernaemontana belongs to the family Apocynaceae, a large and diverse family comprising approximately 400 genera and over 5,000 species distributed predominantly in tropical and subtropical regions. Members of this family are typically characterized by the presence of laticiferous tissues, which produce a distinctive milky latex, and a remarkable ability to synthesize structurally complex terpenoid indole alkaloids (TIAs) of high pharmacological significance **[7]**.

Within the genus, Tabernaemontana includes more than 100 species, many of which are known for their ornamental and medicinal value. *T. divaricata* is among the most extensively studied species due to its rich alkaloidal content and widespread traditional use. Morphologically, it is an evergreen shrub growing to a height of 1.5-1.8 meters (5-6 feet), characterized by glossy opposite leaves that are deep green, elliptic, and approximately 15 cm in length and 5 cm in width. The plant exhibits

dichotomous branching, with branches growing almost parallel to the ground, giving it an attractive horizontal aspect **[6, 7]**.

The flowers are white, waxy, and pinwheel-shaped, measuring approximately 1.5 inches in diameter, with five petals arranged in a distinctive spiral pattern. Both single and double-flowered forms are cultivated. The flowers are borne in small clusters on stem tips and possess a pleasant fragrance that intensifies at night. The plant blooms primarily in spring but flowers appear sporadically throughout the year. The fruits are follicular, occurring in pairs, and the plant exudes a milky latex upon injury, a typical feature of Apocynaceae members **[4, 8]**.

From a chemotaxonomic perspective, the genus is notable for producing a wide array of indole alkaloids such as coronaridine, voacangine, and tabersonine, which serve as important markers for classification and have significant therapeutic potential. The presence of these secondary metabolites supports both its taxonomic placement and pharmacological relevance.

3. GEOGRAPHICAL DISTRIBUTION

T. divaricata is native to South Asia, Southeast Asia, and parts of tropical Africa. In India, the species is extensively found throughout both wild and cultivated environments. It occurs naturally in the upper Gangetic plains, sub-Himalayan tracts (including Garhwal region), northeastern states such as Assam, and eastern regions like West Bengal. Additionally, it is abundantly cultivated in southern states including Karnataka, Kerala, and Tamil Nadu, where it thrives in gardens, temple premises, and roadside plantations.

The plant prefers well-drained soils, moderate rainfall, and partial to full sunlight, making it well adapted to tropical monsoon climates. Its native range extends from the Himalayas to southern China (Yunnan) and throughout Indo-China. The species has been introduced to numerous tropical regions worldwide, including parts of Africa, Central America, the Caribbean, and various Pacific islands **[7-9]**.

4. ETHNOMEDICINAL USES

4.1 Traditional Medicine Systems:

Tabernaemontana divaricata is widely utilized in traditional systems of medicine such as Ayurveda, Siddha, Unani, and various folk practices, where it is often regarded as a versatile therapeutic plant. In India, it is traditionally valued for managing gastrointestinal, urogenital, and dermatological disorders. Different parts of the plant, particularly the leaves and flowers, are employed in multiple forms including decoctions, infusions, and topical pastes **[10]**.

4.2 Specific Therapeutic Applications:

Ethnobotanical reports indicate that leaf extracts are commonly used for treating

fever, cough, respiratory infections, and inflammatory conditions. The milky latex obtained from the leaves is applied externally as a cooling poultice to alleviate pain, swelling, wounds, and skin diseases. The flowers, often processed with oil, are traditionally used for eye ailments such as irritation and soreness, while also being employed as a mild analgesic in Unani medicine.

In certain tribal communities, especially in southern India, the leaves are used for relieving toothache and providing analgesic effects. Classical Ayurvedic literature recognizes the plant (Nandyavarta) in formulations for conditions such as headache, rheumatism, ulcers, and neurological disorders **[9-11]**.

4.3 Summary of Traditional Uses

Table 2: Ethnomedicinal applications of *T. divaricata*

Plant Part	Traditional Use	Preparation Method
Leaves	Fever, cough, respiratory infections	Decoction, infusion
Latex	Pain, swelling, wounds, skin diseases	Topical application
Flowers	Eye ailments, analgesic	Oil preparation
Roots	Hypertension, headaches, scabies	Decoction
Whole plant	Snake and scorpion poisoning	Various

Overall, traditional knowledge consistently highlights its anti-inflammatory, analgesic, antipyretic, anti-diarrheal, and wound-healing properties, supporting its long-standing use in primary healthcare practices **[11]**.

5. PHYTOCHEMISTRY

5.1 Overview of Phytochemical Constituents:

Tabernaemontana divaricata is recognized for its rich and diverse phytochemical profile, with different plant parts, particularly the leaves, serving as reservoirs of biologically active compounds. More than 66 alkaloids have been identified in this species, making it one of the most phytochemically diverse members of the Apocynaceae family **[12]**.

5.2 Indole Alkaloids:

Among these, indole alkaloids constitute the most prominent class, including compounds such as coronaridine, voacangine, tabersonine, and conolidine, which are known for their significant pharmacological potential, especially in analgesic and neuroactive applications. Coronaridine ($C_{21}H_{26}N_2O_2$) is an iboga-type alkaloid that has demonstrated sedative, anxiolytic, anti-addictive, and antinociceptive activities. Its congeners, including 18-methoxycoronaridine (18-MC) and catharanthine, have shown promising pharmacological profiles through modulation of GABAergic pathways and nicotinic acetylcholine receptors **[12, 13]**.

Voacangine, another major iboga-type alkaloid, exhibits structural similarity

to ibogaine but with a more favourable safety profile. Recent studies have demonstrated its potential as an analgesic, anti-inflammatory, and neuroprotective agent **[14]**. Tabersonine, an aspidosperma-type alkaloid, serves as a biosynthetic precursor to other indole alkaloids and has shown antimalarial and cytotoxic activities.

5.3 Flavonoids and Phenolic Compounds:

In addition to alkaloids, the plant contains a variety of flavonoids like quercetin and kaempferol, which contribute to its antioxidant and anti-inflammatory properties. Phenolic compounds are also present and enhance its overall therapeutic profile through free radical scavenging and antimicrobial effects **[13]**.

5.4 Terpenoids:

Terpenoids, including ursolic acid and lupeol, are also present and are associated with anti-inflammatory, hepatoprotective, and anticancer activities. These pentacyclic triterpenes have been shown to inhibit NF-κB signaling and reduce pro-inflammatory cytokine expression **[13, 14]**.

5.5 Summary of Major Phytochemicals

Table 3: Major phytochemical constituents of *T. divaricata*

Compound Class	Representative Compounds	Pharmacological Activity
Indole Alkaloids	Coronaridine, voacangine, tabersonine, conolidine	Analgesic, CNS-modulating, anti-inflammatory
Flavonoids	Quercetin, kaempferol	Antioxidant, anti-inflammatory
Terpenoids	Ursolic acid, lupeol	Anti-inflammatory, hepatoprotective, anticancer
Phenolic Compounds	Gallic acid, caffeic acid	Antioxidant, antimicrobial
Steroids	β-sitosterol	Anti-inflammatory, hypocholesterolemic

The presence of these diverse phytoconstituents not only supports the traditional medicinal uses of *T. divaricata* but also underscores its potential as a valuable source for the development of novel pharmacologically active agents.

6.PHARMACOLOGICAL ACTIVITIES

6.1 Anti-inflammatory Activity:

Tabernaemontana divaricata exhibits significant anti-inflammatory activity, mainly attributed to its rich content of indole alkaloids, flavonoids, and terpenoids. Experimental studies have shown that extracts of the plant, particularly methanolic and ethanolic leaf extracts, can reduce inflammation in animal models such as carrageenan-induced paw edema. The mechanism is believed to involve inhibition of pro-inflammatory mediators like prostaglandins and cytokines, along with stabilization of lysosomal membranes **[14,15]**.

Statistical analysis using one-way ANOVA followed by Bonferroni's post hoc test has demonstrated that both ethanolic and aqueous fractions significantly ($p < 0.05$) reduced inflammation in a dose-dependent manner. The 250 mg/kg dose produced strong anti-inflammatory responses, with no statistically significant difference from

diclofenac within the experimental model **[15, 16]**. These properties support its traditional use in treating inflammatory conditions such as wounds, swelling, and skin disorders.

6.2 Analgesic Activity:

The plant shows significant analgesic (pain-relieving) activity, which is mainly attributed to its indole alkaloid and flavonoid constituents. Experimental studies using models such as acetic acid-induced writhing and hot plate tests in animals have demonstrated that leaf and root extracts reduce pain perception **[17]**.

The analgesic effect is believed to involve both peripheral and central mechanisms, including inhibition of prostaglandin synthesis and modulation of pain receptors. Coronaridine and its congeners have been shown to exert antinociceptive activity through combined inhibitory effects on CaV2.2 channels and α9α10 nicotinic acetylcholine receptors **[17, 18]**. These findings support its traditional use in relieving pain associated with inflammation, wounds, and other conditions.

6.3 Antimicrobial Activity:

Extracts of *Tabernaemontana divaricata* possess notable antimicrobial activity against a range of pathogenic microorganisms. Studies have shown that leaf, stem, and flower extracts exhibit inhibitory effects against Gram-positive bacteria (such as Staphylococcus aureus) and Gram-negative bacteria (such as *Escherichia coli*), as well as certain fungal species.

The antimicrobial effect is largely attributed to bioactive alkaloids and phenolic compounds, which disrupt microbial cell walls and interfere with metabolic processes. This supports its traditional application in treating infections and wounds. Recent studies have also demonstrated activity against drug-resistant strains, highlighting its potential in addressing antimicrobial resistance **[19]**.

6.4 Antioxidant Activity:

The plant demonstrates strong antioxidant potential due to the presence of phenolic compounds, flavonoids, and alkaloids. Various in vitro assays such as DPPH, hydrogen peroxide scavenging, and reducing power assays have confirmed that extracts of *T. divaricata* effectively neutralize free radicals.

Gas chromatography-mass spectrometry (GC-MS) analysis of the ethanolic extract has revealed the presence of 96 phytoconstituents, among which 17 were identified as bioactive compounds, and 11 were specifically associated with antioxidant potential. At a maximum concentration of 10 mg/mL, the extract demonstrated significant radical-scavenging activity, with inhibition values of 64%, 67%, and 69% for hydroxyl, superoxide, and

DPPH radicals, respectively, and corresponding IC_{50} values of 6.7, 6.8, and 6.2 mg/mL **[19, 20]**.

This antioxidant activity helps in preventing oxidative stress-related cellular damage and may contribute to its protective role against chronic diseases. The activity is dose-dependent and comparable to standard antioxidants like ascorbic acid in some studies.

6.5 Antidiabetic Activity:

The plant has shown promising antidiabetic activity in various experimental studies. Extracts of *T. divaricata*, particularly from leaves and flowers, have been reported to reduce blood glucose levels in alloxan- or streptozotocin-induced diabetic animal models **[20, 21]**.

The mechanism may involve enhancement of insulin secretion, regeneration of pancreatic β-cells, and improved glucose utilization. Additionally, the presence of flavonoids and alkaloids contributes to its hypoglycemic effect by reducing oxidative stress associated with diabetes. These properties indicate its potential as a natural therapeutic agent in diabetes management.

6.6 Central Nervous System Activity:

Tabernaemontana divaricata exhibits notable central nervous system (CNS) activity, including sedative, anxiolytic, and neuroprotective effects. Studies have shown that plant extracts can depress locomotor activity, prolong sleep duration, and exhibit anticonvulsant effects in experimental models.

These actions are attributed to alkaloids that may interact with neurotransmitter systems such as GABAergic pathways. Coronaridine congeners have been demonstrated to induce sedative and anxiolytic-like activity through potentiation of $GABA_A$ receptors. Recent investigations (2023) have confirmed that (+)-catharanthine and (-)-18-methoxycoronaridine exert anxiolytic effects in both male and female mice, with the underlying mechanism involving modulation of GABAergic neurotransmission.

The plant is traditionally used in treating neurological disorders, including anxiety and insomnia, and its neuropharmacological potential is being increasingly explored. Additionally, coronaridine and its analogues have shown anti-addictive properties through inhibition of habenular α3β4-containing nicotinic acetylcholine receptors, suggesting potential in substance abuse treatment **[21-23]**.

6.7 Wound Healing Activity:

Traditional use of *T. divaricata* for wound treatment has been validated by experimental studies demonstrating its wound-healing properties. The latex and leaf extracts have been shown to promote tissue regeneration, reduce infection, and accelerate the healing process. The presence

of flavonoids and terpenoids contributes to these effects through anti-inflammatory and antimicrobial mechanisms **[23, 24]**.

6.8 Cytotoxic and Anticancer Activity:

Emerging evidence suggests cytotoxic and anticancer properties of *T. divaricata* extracts. Indole alkaloids, particularly voacangine and coronaridine, have demonstrated cytotoxic effects against various cancer cell lines. The mechanism may involve induction of apoptosis, cell cycle arrest, and inhibition of cell proliferation **[22, 23]**. However, these findings are preliminary and require further investigation to establish their therapeutic potential.

7. EXTRACTION AND ISOLATION METHODS

7.1 Maceration:

The leaves of *Tabernaemontana divaricata* are shade-dried at controlled room temperature (approximately 25°C) to preserve thermolabile constituents, followed by pulverization into a coarse powder and sieving through mesh No. 40 to ensure uniform particle size. The dried powdered material is subjected to maceration with alcohol for a period of five days to facilitate efficient extraction of phytoconstituents **[23, 24]**.

Upon completion of extraction, the solvent is removed by distillation and the extract is further concentrated under reduced pressure at 40°C to obtain a semisolid mass. The resulting extract is then subjected to preliminary phytochemical screening for the identification of various classes of plant constituents.

7.2 Ultrasound-Assisted Extraction:

Ultrasound-assisted extraction (ultrasonication) is an efficient technique for isolating bioactive constituents from the leaves of *T. divaricata*. In this method, shade-dried leaves are powdered and sieved (mesh No. 40), and a known quantity of the powder (e.g., 10-20 g) is mixed with a suitable solvent such as ethanol or methanol in a defined ratio (1:10 w/v).

The mixture is then subjected to ultrasonication using an ultrasonic bath or probe sonicator at a frequency of 20-40 kHz and controlled temperature (25-40°C) for 20-40 minutes. The ultrasound waves generate acoustic cavitation, which disrupts plant cell walls and enhances solvent penetration, thereby improving the release of intracellular phytoconstituents **[25]**.

7.3 Gas Chromatography-Mass Spectrometry (GC-MS) Analysis:

The ethanolic extract of *T. divaricata* leaves was subjected to detailed phytochemical profiling and antioxidant evaluation following extraction. GC-MS analysis revealed the presence of 96 phytoconstituents, among which 17 were identified as bioactive compounds, and 11 were specifically associated with antioxidant potential **[25, 26]**.

The extract was further evaluated through multiple in vitro antioxidant assays, including hydroxyl, superoxide, and DPPH radical scavenging methods, along with reducing power and metal-chelating activity. These results indicate that the ethanolic extract contains significant antioxidant constituents, supporting its potential role as a natural therapeutic agent.

7.4 Comparison of Extraction Methods:

Table 4: Comparison of extraction methods for *T. divaricata*

Method	Advantages	Disadvantages	Yield
Maceration	Simple, low cost	Time-consuming (5 days)	Moderate
Ultrasound-assisted	Rapid (20-40 min), high yield	Equipment required	High
Soxhlet extraction	Continuous extraction	High temperature may degrade thermolabile compounds	High
Decoction	Traditional method	Limited to water-soluble compounds	Low-Moderate

8. TOXICITY AND SAFETY PROFILE

8.1 Acute Toxicity Studies:

The toxicity and safety profile of *Tabernaemontana divaricata* leaf extract has been evaluated through acute toxicity studies in experimental animal models. The ethanolic extract, when administered orally at a high dose of 2 g/kg body weight to overnight-fasted healthy mice, did not produce any mortality or observable signs of toxicity during a 24-hour monitoring period, indicating a relatively wide margin of safety **[27]**.

Behavioural parameters such as locomotor activity, feeding behaviour, and general physical condition remained normal throughout the observation period. These findings suggest that the extract is non-toxic at the tested dose and can be considered safe for further pharmacological investigations. The absence of acute toxicity may be attributed to the presence of naturally occurring phytoconstituents with low toxic potential.

8.2 Dose Selection for Pharmacological Studies:

Based on the acute toxicity data, TD was found to be safe at a dose of 2000 mg/kg, p.o. Therefore, the doses of 100, 200, and 300 mg/kg, p.o. were selected for in vivo pharmacological studies **[8, 28]**. The ethanolic extract of TD has shown positive effects on obsessive-compulsive behaviour and generalized anxiety in mice, with no mortality or serious side effects observed at doses up to 2000 mg/kg.

8.3 Safety Considerations:

Sub-chronic toxicity data are scarce, but traditional use in herbal medicine implies general safety at moderate doses. Nevertheless, all parts of the plant are known to contain toxic alkaloids, so caution is advised. No human clinical toxicity data

were found; thus, recommended therapeutic doses remain empirical **[27-29]**.

Overall, available evidence suggests *T. divaricata* leaf extract has a wide safety margin in rodents, but detailed toxicity and pharmacokinetic studies are needed. For comprehensive safety assessment, additional studies including sub-acute, chronic toxicity, and histopathological evaluations are recommended to establish long-term safety and therapeutic applicability.

9. STRUCTURE-ACTIVITY RELATIONSHIPS

9.1 Iboga-Type Alkaloids:

Structure-activity relationship (SAR) studies on the iboga-type alkaloids found in *T. divaricata* have revealed important insights into their pharmacological activities. Coronaridine, the parent compound, serves as a scaffold for numerous derivatives with enhanced biological activities.

The methoxylation at C-18 position (as in 18-methoxycoronaridine) significantly enhances the anti-addictive and analgesic activities while reducing toxicity compared to ibogaine. The presence of a methoxy group at C-10 (as in voacangine) contributes to neuroprotective effects **[28-30]**.

9.2 Structural Modifications and Enhanced Activity:

Table 5: Structure-activity relationships of major indole alkaloids

Compound	Structural Feature	Enhanced Activity
Coronaridine	Parent iboga scaffold	Sedative, anxiolytic
18-MC	18-Methoxy substitution	Anti-addictive, reduced toxicity
Voacangine	10-Methoxy group	Neuroprotective, analgesic
Catharanthine	C3-C4 double bond	Anxiolytic, antidepressant

Recent investigations have demonstrated that coronaridine congeners exert their pharmacological effects through multiple molecular targets, including $GABA_A$ receptors, nicotinic acetylcholine receptors, and calcium channels. The structural diversity of these alkaloids provides a rich platform for drug discovery and lead optimization **[29, 30]**.

10. CURRENT STATUS AND FUTURE PERSPECTIVES

10.1 Current Research Status:

Research on *T. divaricata* has progressed significantly over the past decade, with numerous studies validating its traditional uses and uncovering new therapeutic applications. The period from 2020-2025 has seen particular advances in understanding its neuropharmacological properties, with coronaridine congeners emerging as promising candidates for anxiety and addiction treatment.

However, several gaps remain in the current knowledge base. Clinical trials are

virtually absent, with most evidence derived from preclinical studies. Standardization of extracts and formulations is lacking, limiting reproducibility and clinical translation **[9, 30-32]**.

10.2 Future Research Directions:

Future research should prioritize the following areas:

1. Clinical trials to establish efficacy and safety in human subjects
2. Development of standardized extracts with defined phytochemical profiles
3. In-depth SAR studies to identify optimal drug candidates
4. Pharmacokinetic and drug metabolism studies
5. Investigation of synergistic effects among phytoconstituents
6. Exploration of novel drug delivery systems
7. Sustainable cultivation and conservation strategies
8. Genomic and proteomic studies to understand biosynthetic pathways

The plant's diverse phytochemical profile and demonstrated pharmacological activities make it a promising candidate for drug development across multiple therapeutic areas.

11. CONCLUSION

Tabernaemontana divaricata is a phytochemically diverse species with a broad spectrum of pharmacological activities supported by extensive preclinical evidence. The plant's rich content of indole alkaloids, flavonoids, terpenoids, and phenolic compounds contributes to its anti-inflammatory, analgesic, antimicrobial, antioxidant, antidiabetic, and CNS-modulating effects. Recent studies (2020-2025) have particularly highlighted the therapeutic potential of coronaridine congeners in neurological disorders. While traditional uses are well-documented and preclinical findings are promising, the translation to clinical practice requires well-designed human studies. The establishment of standardized extraction protocols, comprehensive toxicity profiles, and pharmacokinetic data will be essential for advancing this medicinal plant toward clinical applications. With continued research efforts, *T. divaricata* has the potential to contribute significantly to the development of new therapeutic agents for various diseases.

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