

Khatalimba (Ampelocissus Latifolia): A Pharmacognostic and Preliminary Phytochemical Evaluation

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ABSTRACT

Background: *Ampelocissus latifolia* (Khatalimba), locally known as Jungli angur, is an ethnomedicinal climber used in traditional Rajasthani medicine for treating skin diseases, wound healing, and rheumatic affections. Despite its therapeutic importance, comprehensive pharmacognostic and phytochemical characterization remains incomplete.

Objective: To evaluate the pharmacognostic properties and conduct preliminary phytochemical screening of *A. latifolia* collected from Udaipur, Rajasthan, establishing baseline data for authentication and quality control.

Materials and Methods: Fresh spec were collected from Udaipur, authenticated by taxonomists at Dr. Sarvepalli Radhakrishnan Rajasthan Ayurved University (Herbarium No. DSRRAU/PGIA/DG/25-B/2025), and preserved in FAA fixative and dry conditions. Organoleptic, macroscopic, and microscopic (transverse sections and powder microscopy) examinations were performed. Physicochemical parameters (ash value, extractive values, moisture content, pH, foreign matter) were determined per WHO guidelines. Qualitative phytochemical screening employed petroleum ether, benzene, chloroform, acetone, methanol, and water extracts. TLC and HPTLC fingerprinting were conducted on methanol root extract using optimized solvent systems.

Results: Organoleptic evaluation revealed distinct characteristics: root (coarse, reddish-brown, sweet), leaf (mildly coarse, greenish-brown, bitter-salty), and stem (spongy, light yellow, salty-sweet). Macroscopically, the plant is a 3–6 m herbaceous climber with heart-shaped, 3–7 lobed leaves. Microscopically, root TS showed single-layered epiblema, wide cortex (8–10 layers) with sclereids, and broad medullary rays (6–10 cells) containing both acicular and sphaeraphide calcium oxalate crystals—unique diagnostic markers. Physicochemical analysis showed total ash 11.26%, acid-insoluble ash 3.18%, alcohol-soluble extractive 42.68%, water-soluble extractive 36.89%, loss on drying 4.94%, pH 7.78, and foreign matter 0.45%. Phytochemical screening revealed alkaloids in aerial parts (leaf/stem), while flavonoids, saponins, and tannins were exclusive to root. TLC showed four R_f values (0.28, 0.41, 0.50, 0.56). HPTLC revealed 6 peaks at 254 nm, 3 peaks at 366 nm, and 14 peaks at 540 nm (non-polar system); 6 peaks at 254 nm, 6 peaks at 366 nm, and 16 peaks at 540 nm (polar system), with maximum peak areas at R_f 0.24 (254 nm), R_f 0.33 (366 nm), and R_f 0.08/0.19 (540 nm).

Conclusion: This study establishes comprehensive pharmacognostic, physicochemical, and chromatographic standards for *A. latifolia*, providing diagnostic markers for authentication and quality control. The unique phytochemical distribution (alkaloids in aerial parts, flavonoids/saponins in root) validates traditional part-specific uses. The HPTLC fingerprint profile serves as a reference standard for detecting adulteration, supporting the integration of *A. latifolia* into modern herbal medicine systems and facilitating future bioactivity-guided drug discovery.

KEYWORDS: *Ampelocissus latifolia*, *Khatalimba*, pharmacognosy, phytochemical screening, HPTLC fingerprint, quality control, standardization, ethnomedicine

INTRODUCTION

Traditional and folk medicine continues to play a critical role in primary healthcare across the world, especially in developing countries and rural communities where access to modern

medical services is limited. The World Health Organization recognizes contemporary folk medicine as knowledge-based healing practices, frequently transmitted orally, and increasingly integrated with conventional healthcare as complementary approaches. Drivers of this sustained reliance include cultural acceptance, affordability, perceived safety of natural remedies, and a preference for holistic therapies.

India, with the second largest tribal population globally, harbors profound ethnobotanical knowledge accumulated over generations. Rajasthan, the largest Indian state by area, exemplifies this dynamic. With over 50 million inhabitants, a largely rural population, and rich floral diversity concentrated in regions such as the Aravalli range and northwest districts, Rajasthan supports diverse traditional medical practices. Numerous ethnobotanical surveys and reviews have documented the medicinal flora of the state and its tribal uses, including studies from southern Rajasthan tribal areas, although detailed pharmacological and phytochemical characterizations remain incomplete for many species, over 50 plants from Rajasthan's arid zone have been reported to possess medicinal property^{1,2}.

Ampelocissus latifolia (locally known as Khatalimba) is a climber native to the Indian subcontinent and occurs across several Indian states, including parts of Rajasthan such as Alwar, Banswara, Bhilwara, Kota, Sawai Madhopur, and Udaipur, particularly in the eastern Aravalli hedges and forest undergrowth³. While ethnobotanical reports record widespread use of many regional species for conditions ranging from metabolic disorders to seasonal ailments, rigorous pharmacognostic descriptions and phytochemical analyses for many traditionally used plants are still lacking. Documenting such plants is critical both for validating traditional claims and for identifying bioactive constituents that could inform drug discovery and sustainable management of botanical resources¹.

This study presents a pharmacognostic evaluation and preliminary phytochemical screening of Khatalimba (*Ampelocissus latifolia*) collected from the Udaipur, Rajasthan—a site noted for its biodiversity. The objectives are to provide macroscopic and microscopic diagnostic features to aid accurate identification and quality control, perform standard physicochemical and organoleptic characterizations, and conduct preliminary qualitative phytochemical tests to detect major classes of secondary metabolites. These data also complement more recent analytical work. Such baseline data aim to bridge ethnobotanical knowledge and scientific

validation, creating a foundation for future bioactivity-guided studies on various medicinal properties reported for this species and for conservation efforts.

AIM AND OBJECTIVES

- To collect, identify, and authenticate specimens of Khatalimba (*Ampelocissus latifolia*)
- To document and analyze the macroscopic (morphological and organoleptic) properties of the whole plant.
- To perform detailed microscopic examination of transverse sections of root, stem, and leaf.
- To conduct diagnostic powder microscopy analysis of the root for authentication purposes.

MATERIALS AND METHODS

Khatalimba (*Ampelocissus latifolia*) commonly known as Jungli angur (Wild Grape), Gobralata, Govila, or Icer, is a large twining herbaceous climber with a perennial rootstock. The leaves are broadly heart-shaped, 3–7-angled or shallowly lobed, with toothed edges, and are smooth (glabrous) when mature. The flowers are reddish-brown, arranged in compact pyramidal clusters, with peduncles bearing two-branched tendrils. The plant has a truncate calyx and oblong petals. The fruits are black, ellipsoid berries containing 2–4 hard, stony seeds. flowering and fruiting occur from September to June. The species is widely distributed across India, from Kumaon to Moradabad, Assam, Konkan to Coromandel, and Rajasthan. It grows as a wild, terrestrial climber in open waste lands, shrubberies, and hedges, preferring disturbed habitats and forest edges^{4,16,17}.

Plant Collection and Authentication

Khatalimba (*Ampelocissus latifolia*) was collected from Udaipur district. The sample is checked and verified by Dr. Ramkishor Deshwal at the level of plant collection and checked and verified by Dr. Chandan Singh (professor & HOD), Dr. Manoj Kumar Adlakha (Associate Professor) and Dr. Rajendra Prasad Purvia (associate professor) at Post Graduate Department of Dravyaguna Vigyan of Dr. Sarvepalli Radhakrishnan Rajasthan Ayurved University, Jodhpur, Rajasthan. For future reference, herbarium sheet was submitted to pharmacognosy laboratory of this institute & authenticated, provided with herbarium reference no. DSRRAU/PGIA/DG/25-B/2025. The collected plant specimens were taxonomically identified and authenticated through consultation with standard botanical Floras and online databases.

To ensure proper authentication and preservation, fresh sample of *Ampelocissus latifolia*

were preserved under two conditions:

- (i) wet condition using FAA fixative solution (Ethyl alcohol: Glacial acetic acid : Formalin :: 90:5:5) and
- (ii) dry condition for future studies^{5,6}.

Organoleptic Study

Both freshly collected and shade-dried samples of *A. latifolia* (including root, leaf, stem, and floral parts) were subjected to organoleptic evaluation. This assessment involved the systematic documentation of the following sensory characteristics- Taste: The flavor profile when tasted (e.g., bitter, sweet, astringent, pungent), Odor: The characteristic smell or aroma (e.g., aromatic, faint, unpleasant), Color: The visual appearance under natural light (e.g., green, brown, reddish), Texture/Touch: The tactile sensation (e.g., smooth, rough, soft, hard, fibrous)^{18,19,20}.

MACROSCOPIC STUDY

Fresh specimens of *A. latifolia* were analyzed for multiple macroscopic attributes, namely shape, venation, margin type, apex morphology, base structure, surface characteristics, and texture, in accordance with established botanical Floras and reference texts. Visual examination was performed using unaided vision, while size measurements were obtained using a centimeter ruler.

- **Transverse sections (TS):** Thin transverse sections of the root, leaf, and stem were prepared using the free-hand technique and cleared with chloral hydrate to enhance tissue transparency for better visualization of anatomical details. The microscopic characteristics and anatomical features of all three plant parts were examined using a Quasmo binocular compound microscope. For histochemical analysis, thick transverse sections of the root and stem were treated with specific staining reagents: Phloroglucinol followed by concentrated HCl to detect lignin (lignified tissues appear pink/red), iodine solution to identify starch grains (starch appears blue-black), and ferric chloride solution to detect tannins (tannins appear blue-black or green), allowing for the identification of specific histochemical constituents within the plant tissues⁷.
- **Powder Microscopy:** The powders of root, leaf, stem, and flower were examined individually under a microscope, and photomicrographs were captured using a Canon digital camera mounted on a Carl Zeiss microscope.

- **Physicochemical Analysis:** The powdered materials of root, leaf, and stem from *A. latifolia* were analyzed for standard physicochemical parameters, which included determination of moisture content, total ash value, acid-insoluble ash, pH, water-soluble extractive value, and alcohol-soluble extractive value, following internationally recognized standard pharmacopeial procedures⁸.
- **Preliminary Phytochemical Screening:** powdered materials was extracted using ethanolic and aqueous solvents following standard extraction protocols. The resulting extracts were subjected to qualitative phytochemical screening to detect the presence or absence of major classes of phytochemical compounds⁹.
- **HPTLC Fingerprinting:** Methanol extract of *A. latifolia* root was analyzed by HPTLC using two solvent systems: Toluene:Chloroform:Ethyl acetate (10:2:1) for non-polar compounds and Toluene:Ethyl acetate:Formic acid:Methanol (6:6:1.6:0.4) for polar compounds^{10,11}.

OBSERVATION AND RESULTS

Organoleptic Characterization: Organoleptic evaluation of the powdered form of *Ampelocissus latifolia*

Table: 1

PARAMETERS	Root	Leaf	Stem	Whole plant
Texture	Coarse	Mildly coarse	Spongy	Coarse
Colour	Reddish brown	Greenish brown	Light yellow	Light brown
Taste	Sweet	Bitter, Salty	Salty, Sweet	Sweet
Odour	Sweet	Odourless	Sweet	Odourless

Macroscopic studies

The plant is a climber with a cylindrical, mostly non-woody annual stem 3–6 m long and 7.5–12 mm in diameter. The bark is smooth and green, frequently purple-tinged at the nodes and covered by a thin glaucous bloom. Young shoots are glabrous and hollow. Tendrils are forked. Leaves are broadly circular to heart-shaped, measuring about 7–15 × 8–15 cm and divided into 3–7 pointed, toothed lobes. The petiole is 3–5 cm (occasionally up to 20 cm) and deeply

grooved above; leaf margins are crenate-serrulate to dentate. Young leaves are mealy and cordate, becoming nearly hairless with conspicuously pubescent veins when mature, often showing a pink or purple tinge beneath; the leaf base has 5–7 main nerves. Roots form an irregular, tuberous rootstock that tapers at both ends and swells in the middle, with a reddish-brown color. Flowers are numerous, deep reddish, about 2.5 mm across, with five oblong petals. They occur in pyramidal, pubescent paniced cymes borne on a stout peduncle that also bears a forked tendril. Petals are free at the tips and recurved, smooth on both surfaces; stamens are bright yellow. The compact cyme has a stalk about 6–7 cm long and terminates in a long bifurcate tendril. Flowering occurs from May to August. Fruits are globose, black, juicy berries about 6–7 mm in diameter, usually containing two seeds and occasionally three^{12,13,14,15}.

Microscopic Studies

Microscopic examination of the root transverse section shows: Epiblema and cortex: A single outer layer of compact parenchymatous cells bearing root hairs. The cortex is wide, made up of 8–10 layers of parenchyma that include sclereids. Vascular region: Clearly differentiated xylem and phloem separated by broad medullary rays that are 6–10 cells wide (seriate). Crystals: Unstained preparations display both needle-shaped (acicular) and spherical (sphaeraphide) calcium oxalate crystals. A transverse stem section is roughly oval to circular and shows these features: Epidermis and cortex: The outer cork consists of 2–5 tightly packed cell layers. Beneath it the cortex includes 3–6 layers of collenchyma and 3–8 layers of loosely arranged parenchyma. Vascular bundles: Collateral bundles form a ring, with phloem located toward the outside and xylem toward the centre. Pericycle: Pericyclic fibres made of sclerenchymatous cells form a cap-like layer over the vascular bundles. Microscopic leaf characters important for taxonomy include: Epidermis and stomata: The upper and lower epidermises bear simple unicellular and two-celled non-glandular hairs with pointed tips. Crystals: Both leaf surfaces contain needle-shaped calcium oxalate crystals. Mesophyll: Tissue is differentiated into palisade and spongy parenchyma^{12,13,14,15}.

Physicochemical evaluation

The physicochemical evaluation of Khatalimba (*Ampelocissus latifolia*) was conducted according to WHO guidelines and standard pharmacopoeial methods. The total Ash value of the root was found to be 11.26% w/w, while the acid-insoluble ash was 3.18% w/w, indicating the presence of natural inorganic constituents with minimal extraneous matter. These values are within acceptable limits for herbal drugs and can be used as standards for quality control.

Extractive values were determined using different solvents. The alcohol-soluble extractive value was 42.68 % w/w, and the water-soluble extractive value was 36.89 % w/w, indicating the presence of polar bioactive constituents including alkaloids, flavonoids, and glycosides. These values are important for standardization and quality control purposes.

The loss on drying was 4.94 % w/w, which is within acceptable limits for herbal drugs and ensures stability during storage. The pH of 1% w/v aqueous extract was 7.78%. Foreign matter was limited to 0.45 % w/w, confirming the purity of the collected plant material²¹.

Preliminary phytochemical screening

Qualitative phytochemical screening was conducted on successive extracts of *A. latifolia* leaf, stem, and root powder using petroleum ether, benzene, chloroform, acetone, methanol, and water as solvents (see Table). Alkaloids were detected in chloroform, methanol, and water extracts of leaf and stem but were absent in root. In contrast, flavonoids were present in chloroform, acetone, methanol, and water extracts of root only, with no detection in leaf or stem. Saponins were found exclusively in methanol and water extracts of the root. Carbohydrates were present in methanol and water extracts of all three plant parts (leaf, stem, and root). Phytosterols were identified in petroleum ether and acetone extracts of leaf. Tannins and phenolic compounds were detected in acetone, methanol, and water extracts of root. Cardiac glycosides and coumarins were absent in all solvent extracts of leaf, stem, and root. Anthraquinone glycosides were found in chloroform, acetone, methanol, and water extracts of leaf. The differential distribution of phytoconstituents across plant parts and solvent extracts serves as a valuable tool for plant identification and authentication²¹.

Table: 2

Preliminary phytochemical screening of <i>A. latifolia</i>																		
Tests of Phytoconstituents	P. ether			Benzene			Chloroform			Acetone			Methanol			Water		
	L	S	R	L	S	R	L	S	R	L	S	R	L	S	R	L	S	R
ALKALOIDS																		
Mayer's reagent	*	*	*	*	*	*	+	+	-	*	*	*	+	+	-	+	+	-
Dragendorff's reagent	*	*	*	*	*	*	+	+	-	*	*	*	+	+	-	+	+	-
Hager's reagent	*	*	*	*	*	*	+	-	-	*	*	*	+	-	-	+	-	-

Wagner's reagent	*	*	*	*	*	*	+	-	-	*	*	*	+	-	-	+	-	-
FLAVONOIDS																		
Shinoda test	-	-	-	-	-	-	-	-	+	-	-	+	-	-	+	-	-	+
Fluorescence test	-	-	-	-	-	-	-	-	+	-	-	+	-	-	+	-	-	+
SAPONINS																		
Froth test	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	+
CARBOHYDRATE																		
Molisch's test	*	*	*	*	*	*	*	*	*	*	*	*	+	+	+	+	+	+
Fehling's test	*	*	*	*	*	*	*	*	*	*	*	*	+	+	+	+	+	+
Barfoed's test	*	*	*	*	*	*	*	*	*	*	*	*	-	-	+	-	-	+
Benedict's test	*	*	*	*	*	*	*	*	*	*	*	*	-	-	+	-	-	+
Test for gums	*	*	*	*	*	*	*	*	*	*	*	*	-	-	-	-	-	-
Test for mucilage	*	*	*	*	*	*	*	*	*	*	*	*	-	-	+	-	-	+
PHYTOSTEROLS																		
Libermann-Burchard test	-	-	-	*	*	*	*	*	*	+	-	-	-	-	-	*	*	*
Burchard's test	+	-	-	*	*	*	*	*	*	+	-	-	-	-	-	*	*	*
Salkowski reaction	+	-	-	*	*	*	*	*	*	+	-	-	-	-	-	*	*	*
TANNINS AND PHENOLIC																		
Test with gelatin	*	*	*	*	*	*	*	*	*	*	*	*	-	-	+	-	-	+
With Lead acetate	*	*	*	*	*	*	*	*	*	*	*	*	-	-	+	-	-	+
CARDIAC GLYCOSIDE																		
Baljet's test	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Legal's test	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Keller killiani test	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
COUMARINS																		
With ammonia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hydroxylamine HCl	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ANTHRAQUINONE GLYCOSIDE																		
Borntrager's test	*	*	*	*	*	*	+	-	-	+	-	-	+	-	-	+	-	-
Modified Borntrager's test	*	*	*	*	*	*	+	-	-	+	-	-	+	-	-	+	-	-
L: Leaf, S: Stem, R: Root, +: Present, -: Absent, *: not done.																		

Thin Layer Chromatography

R_f of TLC of methanol extract of *A. latifolia* root²¹

Table: 3

Toluene: ethyl acetate: formic acid (5:5:0.5)	
254nm R _f	366nm R _f
0.28	0.28
0.41	0.43
0.50	0.56
0.56	0.87

HPTLC Fingerprinting of Root Extract

The methanol extract of *A. latifolia* root was analyzed by HPTLC using two solvent systems: Track 1 (non-polar:Toluene:Chloroform:Ethyl acetate, 10:2:1) and Track 2 (polar: Toluene:Ethyl acetate:Formic acid:Methanol, 6:6:1.6:0.4). Result shows: In the non-polar solvent system, HPTLC analysis revealed 6 peaks at 254 nm (R_f: 0.09, 0.16, 0.24, 0.32, 0.77, 0.96), 3 peaks at 366 nm (R_f: 0.14, 0.33, 0.13), and 14 peaks at 540 nm after derivatization (R_f: 0.08, 0.10, 0.14, 0.19, 0.46, 0.55, 0.63, 0.69, 0.73, 0.79, 0.84, 0.90, 0.94, 0.96). The highest peak areas occurred at R_f 0.24 (254 nm), R_f 0.33 (366 nm), and R_f 0.08 (540 nm). In the polar solvent system, 6 peaks were detected at 254 nm (R_f: 0.14–0.86), 6 peaks at 366 nm (R_f: 0.15–0.96), and 16 peaks at 540 nm after derivatization (R_f: 0.09–0.93). The maximum peak areas were recorded at R_f 0.24 (254 nm), R_f 0.24 (366 nm), and R_f 0.19 (540 nm)²¹.

DISCUSSION

The comprehensive pharmacognostic, physicochemical, phytochemical, and chromatographic evaluation of *Ampelocissus latifolia* (Khatalimba) establishes a scientific foundation for authentication, quality control, and standardization of this important ethnomedicinal plant²².

Organoleptic and Macroscopic Features

Distinct sensory characteristics were observed among plant parts. The coarse, reddish-brown, sweet-tasting root differs markedly from the mildly coarse, greenish-brown, bitter-salty leaf and light yellow, salty-sweet stem, providing reliable diagnostic markers. Macroscopically, *A. latifolia* is confirmed as a large herbaceous climber with a cylindrical,

non-woody stem (3–6 m × 7.5–12 mm), smooth green bark with purple-tinged nodes, forked tendrils, and heart-shaped, 3–7 lobed leaves (7–15 × 8–15 cm), consistent with botanical descriptions²³.

Microscopic Markers

Microscopic examination revealed definitive diagnostic features. The root TS showed a single-layered epiblema, wide cortex (8–10 layers) with sclereids, and broad medullary rays (6–10 cells). The presence of both acicular and sphaeraphide calcium oxalate crystals is a unique marker distinguishing *A. latifolia* from adulterants. The stem TS exhibited collateral vascular bundles in a ring with pericyclic fiber caps, while the leaf displayed simple unicellular hairs, needle-shaped crystals, and differentiated mesophyll²².

Physicochemical Standards

The total ash (11.26% w/w) and acid-insoluble ash (3.18% w/w) confirm purity with minimal extraneous matter (0.45% w/w). The high extractive values (alcohol: 42.68%, water: 36.89% w/w) indicate substantial polar bioactive constituents (alkaloids, flavonoids, glycosides), significantly higher than previous reports (18.45% and 22.34%), suggesting the Bagdarah Nature Park germplasm has superior bioactive content. The low moisture content (4.94% w/w) ensures storage stability, while pH 7.78 indicates slightly alkaline nature^{23,26}.

Phytochemical Distribution

A distinct phytoconstituent pattern emerged: alkaloids concentrated in aerial parts (leaf/stem), while flavonoids and saponins were exclusive to root. This suggests the root is the most pharmacologically active part, supporting traditional use for skin diseases, wound healing, and rheumatic affections. Phytosterols in leaf and tannins/phenolics in root support diverse therapeutic applications. The absence of cardiac glycosides and coumarins confirms safety. Anthraquinone glycosides in leaf suggest laxative activity^{24,26,27}.

Chromatographic Fingerprinting

TLC revealed four distinct R_f values (0.28, 0.41, 0.50, 0.56), confirming multiple UV-absorbing compounds. HPTLC provided comprehensive profiling: non-polar system showed 6 peaks (254 nm), 3 peaks (366 nm), and 14 peaks (540 nm), while polar system revealed 6 peaks (254 nm), 6 peaks (366 nm), and 16 peaks (540 nm). The highest peak areas at R_f 0.24 (254

nm), Rf 0.33 (366 nm), and Rf 0.08/0.19 (540 nm) identify potential marker compounds for standardization²².

Comparative Significance and Pharmacological Correlation

Findings are consistent with previous reports, with significantly higher extractive values indicating superior bioactive content. The flavonoid, alkaloid, and phenolic profile correlates with documented anti-inflammatory activity (inhibiting prostaglandin and kinin synthesis) and antioxidant properties. GC-MS analysis identified 14 phytochemical compounds, confirming the presence of various functional groups and phytocompounds. The HPTLC fingerprint profile serves as a reference standard for detecting adulteration^{25,26,27}.

Limitations and Future Directions

Several limitations of this study should be acknowledged. First, the phytochemical screening was qualitative in nature, and quantitative analysis of major phytoconstituents is needed to establish precise concentration ranges. Second, the HPTLC method was not validated according to ICH guidelines, and future studies should include validation parameters such as linearity, accuracy, precision, limit of detection (LOD), and limit of quantitation (LOQ). Third, the chromatographic analysis was limited to methanol extract of root, and future studies should include other plant parts and solvent extracts for comprehensive profiling.

Future research should focus on

Isolation and structural elucidation of major bioactive compounds. Quantitative HPTLC/GC-MS/LC-MS analysis of marker compounds. Correlation of phytochemical content with pharmacological activity. Development of validated analytical methods for routine quality control. Comparative studies of germplasm from different geographical locations.

CONCLUSION

The comprehensive pharmacognostic, physicochemical, phytochemical, and chromatographic evaluation of Khatalimba (*Ampelocissus latifolia*) establishes a scientific foundation for the authentication, quality control, and standardization of this important ethnomedicinal plant. The distinct organoleptic, macroscopic, microscopic, physicochemical, and chromatographic characteristics provide multiple diagnostic markers for proper identification and detection of

adulteration. The differential distribution of phytoconstituents across plant parts and solvent extracts provides valuable information for selecting the appropriate plant part for specific therapeutic applications. The HPTLC fingerprint profile obtained in this study can serve as a reference standard for future quality control and standardization efforts. These findings support the traditional use of *A. latifolia* and provide a scientific basis for its integration into modern herbal medicine systems.

CONFLICT OF INTEREST

Authors have declared no conflict of interest exist.

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