WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF Impact Factor 8.453
Volume 14, Issue 16, 845-854. Research Article ISSN 2277–7105

STANDARDIZATION OF *HARITAMANJARI* (*ACALYPHA INDICA LINN.*) WHOLE PLANT: AN INSIGHT INTO ITS PHYTOCHEMICAL AND PHYSICOCHEMICAL PROFILE

Dr. Sakshi S. Pali[1]* and Dr. Surekha T. Landge[2]

[1]M.D. Final Year (Dravyaguna Vigyana), Shri Ayurved Mahavidyalaya, Nagpur, Maharashtra, India.

[2]M.D. (Dravyaguna Vigyana), Assistant Professor and HOD (Dravyaguna Vigyana), Shri Ayurved Mahavidyalaya, Nagpur, Maharashtra, India.

Article Received on
25 June 2025,

Revised on 15 July 2025,
Accepted on 06 August 2025

DOI: 10.20959/wjpr202516-37937

***Corresponding Author**
Dr. Sakshi S. Pali
M.D. Final Year (Dravyaguna Vigyana), Shri Ayurved Mahavidyalaya, Nagpur, Maharashtra, India.

ABSTRACT

Acalypha indica Linn., known in Ayurveda as *Haritamanjari* or *Muktavarcha*, is a herbaceous weed belonging to the Euphorbiaceae family, commonly found all over India. However, it is not mentioned in *Brihattrayi* and *Laghutrayi*; it has been introduced in *Bhavaprakasha Nighantu* and *Nighantu Adarsha* for its therapeutic properties, such as *Kaphaghna, Vamaka, Krimighna, Mutrala,* and *Twakdoshahara.* In this study we have executed phytochemical and physicochemical analysis of the whole plant of *Haritamanjari* in six different solvents. Phytochemical tests showed the presence of flavonoids, alkaloids, proteins, amino acids, glycosides, and steroids across various solvents, with flavonoids seen prominently in ethanol and methanol solvents. Saponins and starch were absent. Physicochemical analysis revealed moisture content of 6.7% (w/w), total ash of 9.5% (w/w), acid-insoluble ash of 1.9% (w/w), and water-soluble extractive of 24.5% (w/w), all within acceptable API limits. The study confirms the presence of multiple active constituents in the whole plant of *Haritamanjari* (*Acalypha indica Linn.)* and supports its traditional therapeutic claims. The physicochemical values indicate good quality and unadulterated plant material. The results assure its involvement in pharmacological research and standardization protocols for Ayurvedic formulations.

KEYWORDS: Haritamanjari, Muktavarcha, Phytochemical screening, Physicochemical analysis, Standardization.

INTRODUCTION

Indian acalypha, or Indian copperleaf, known in Ayurved as *Haritamanjari (Acalypha indica* Linn.), is an annual herbaceous plant belonging to the Euphorbiaceae family commonly found all over India. It often grows as a weed on roadsides and farms. The leaves of *Haritamanjari* are long and petiolate, and it bears axillary floral structures that are cup-shaped in which the fruit is present. Although it is not mentioned in *Brihattrayi* and *Laghutrayi*, *Acharya Bhavmishra* and *Bapalal Vaidya* have described it in their *Nighantu,* namely, *Bhavprakash Nighantu* and *Nighantu Adarsh*, respectively. *Bhavprakash* has described *Muktavarcha* as *Kaphaghna*, *Vamaka* (emetic), *Stransana* (laxative), *Krimighna* (anthelmintic), *Mutrala* (diuretic), and *twakadoshahara* (useful in skin disorders). *Swaras* (fresh juice) is given to children to induce vomiting. Its *Kwatha* (decoction) acts as a mild purgative.[1] While in *Nighantu Adarsha* of *Vaidya Bapalal*, the plant is described as *Dadara* (*Kuppi*). In the book Indian Medicinal Plants, a compendium of 500 species Volume 1, *Acalypha indica* is mentioned as "*Kokila kakali munda kutsyaparni vrsodari svetasunthi murakanta prokta haritamanjari.* "[2]

Ethnomedical application

It is a well-documented medicinal plant in traditional practices its ethnomedical applications are based on local knowledge, especially in tribal and rural communities. Some of which are listed below.[3]

Table no. 1: Ethnomedical applications of *Haritamanjari* (*Acalypha indica Linn.*).

Traditional use	Part used
Respiratory disorders	Leaf juice as emetic and expectorant in cough and asthma.
Skin disease	Leaf paste applied for eczema, scabies, wounds, etc.
Gastrointestinal disease	Decoction or juice as purgative and anthelmintic.
Urinary diseases	Whole plant or leaf decoction used as diuretic.
Gynecological issues	Leaf decoction for delayed or painful menstruation.
Rheumatic pain	Leaf paste applied locally on joint.
Insect bite	Leaf paste as antidote.

The leaves possess laxative properties used in the form of *churna* or *kwatha*; when mixed with garlic can be used as anthelmintic. Mixed with common salt the leaves are applied to scabies while leaf *swaras* when mixed with oil forms a useful application in rheumatic arthritis. The *kwatha* is employed in ear ache. The *churna* of the dried leaves is used in bed sores. In case of obstinate constipation of children, the leaves *kalka* is made into a ball and

introduced into the rectum which causes relief in the contraction of the sphincter ani and produces free motions.[4]

Vernacular names[5],[6]

Table no. 2: Vernacular names of *Haritamanjari* (*Acalypha indica Linn.*).

Sanskrit	Muktavarcha, Arishtamanjari
Hindi	Khokhala, Kuppi
Marathi	Khokhali, Kupi, Khajoti
Gujrati	Dadaro, Venchikanto
Punjabi	Kuppi
Bengali	Muktavarshi, Muktajhuri
Oddisi	Indramaris, Nakachana
Assamese	Patrasaki, Mukutamanjari
Kannada	Kuppigida
Malayalam	Kuppameni
Tamil	Kupaaimeni
Telugu	Kuppichettu, Kuppinta, Muripindi
English	Indian Acalypha, Indian Copperleaf, Indian Nettle
Latin	*Acalypha indica Linn.*

Traditionally the leaf juice is applied on *Dadru* (ringworm), which can be the reason for its name '*Dadar*' or '*Dadara.'* The origin of the name '*Khokhli*' may be due to its usefulness in respiratory disorders like asthma and whooping cough. The shape and structure of the flower corresponds to a small container called *Kuppi*, which could have contributed to its naming.[5]

Taxonomic rank[7]

Table no. 3: Taxonomic rank of *Haritamanjari* (*Acalypha indica Linn.*).

Kingdom	Plantae
Division	Magnoliophyta (Angiosperms)
Class	Magnoliopsida (Dicotyledons)
Order	Malpighiales
Family	Euphorbiaceae
Genus	*Acalypha*
Species	*A. indica*
Botanical name	*Acalypha indica*

***Guna and Karma*[4],[5]**

Table No. 4: *Guna* and *Karma* of *Haritamanjari* (*Acalypha indica Linn.*).

Rasa	*Tikta, katu*
Guna	*Laghu, ruksha*
Virya	*Ushna*
Vipaka	*Katu*
Karma	*Kaphaghna, Vamaka, Stransana, Krimighna, Mutrala, Twakdoshahara, Amadoshahara*

In the book Indian Medicinal Plants, a compendium of 500 species Volume 1, its properties are as follows-

"Kasasvasahari tikta kaphaghni katuka tatha Rechani mutrala jwaravatahara smrta
Tatpatracvarasam proktam karnasulaharam param
Patrakalkasya varttistu balanam malabandhahrt" (Sva.)

Botanical description[8]

a. Macroscopic

Leaf-Simple and alternate, dull green to dark green; brittle when dry. The petiole measures 1 to 7 cm. Lower leaves have longer petioles and are pubescent in nature. The leaf lamina is about 2 to 5 cm long and 1 to 4 cm broad. It is ovate to rhomboid ovate. Dark green above and pale green below. Margins are serrated and hairy. The tip is acute, and the base is cuneate. Leaf veins are 5 to 7 in pairs and generally alternate. 3 Veins arises from the base which are prominent. The midrib is slightly raised on the upper surface and prominent on the lower surface.

Stem-A mature stem is brownish, while a younger stem appears green. Its thickness is 2 to 10 mm, and it is hairy.

Root-It is branched and vertical, 2 to 8 mm thick, rough, tortuous (twisted), and greyish to brown in color; its fracture gives rise to dusty particles, a characteristic smell, and a bittertaste.

Inflorescence-Axillary, with peduncle, sessile (without individual stalk), 1 to 7 cm long; flowers are unisexual, green, and encircled by a leafy bract, which is serrated. Female flowers are 5 to 15, basal. Male flowers are numerous and terminate in an allomorphic flower. Fruit capsules are small and green. Seeds are minute, ovoid, and pale brown in color.

b. Microscopic

Leaf- Epidermis-Upper and lower epidermis containing single-layered cells covered with a thick cuticle. Parenchyma- Palisade parenchyma is single-layered and compact with radially elongated cells, while spongy parenchyma is present in multiple layers and loosely arranged with intercellular spaces. Collenchyma- The collenchyma consists of thick-walled collenchymatous cells below the vascular bundle. Trichomes- Trichomes are multicellular epidermal hairs present rarely on the upper epidermis and were numerous on the lower

epidermis.

Stem- Epidermis- Outer layer of epidermal cells embedded with globular masses of calcium oxalate crystals and stomata. Cortex- Parenchymatous cortex region showing clusters of prismatic crystals of calcium oxalate and starch grains. Pith- It is wide and parenchymatous.

Xylem- Xylem fibers are well developed and brownish red in color. Phloem- Phloem fibers are thick-walled and cellulosic in the inner part and lignified in the outer part.

Root- Cork- Outline shows outermost irregular running cork. Phloem- It occupies almost the major area of the section. Cortex- Parenchymatous, narrow, embedded with rosette, cluster, and prismatic crystals of calcium oxalate. Xylem- It is very wide, shows isolated xylem vessels, xylem parenchyma is mostly vesicentric, and medullary rays contain starch grains.

MATERIALS AND METHODS

Plant Collection

The healthy and matured whole plants of *Haritamanjari* (*Acalypha indica Linn.*) were collected from the peripheries of Shri Ayurveda Mahavidyalaya, Nagpur, where it was growing abundantly. The plants were uprooted and washed with clean water. The collected sample was cut into small pieces and was shed-dried at normal room temperature for four weeks. After complete drying, the sample was crushed into fine powder with the help of a mixture grinder. The obtained powdered sample of approximately 500 gm in weight was used for phytochemical and physicochemical analysis.

Preparation of Plant Solvents

For preparing the aqueous, ethanol, methanol, hydro-alcoholic, chloroform, and ether solvents, a 5 gm sample and 50 ml of each solvent were kept in conical flasks separately and was stirred vigourously for six hours then was kept for 18 hours. Then the mixture was filtered using filter paper for carrying out the phytochemical and physicochemical screening.

Phytochemical Analysis[9]

The qualitative phytochemical analysis of the sample was carried out using six different solvents, viz., aqueous, ethanol, methanol, hydroalcoholic, chloroform, and ether, for the detection of carbohydrates, flavonoids, tannins, amino acids, starch, glycosides, steroids, triterpenoids, proteins, alkaloids, and saponin using standard phytochemical screening

methods. Results are tabulated in table no.5.

1. **Test for Carbohydrates (Molisch's test):** A purple or violet ring appears at the junction on adding alcoholic α-naphthol and concentrated H_2SO_4 if carbohydrates are present.

2. **Test for Flavonoids**

Shinoda test: On adding magnesium turnings and concentrated HCl to the test solution, pink, scarlet, crimson red, or occasionally green to blue color appears after a few minutes.

Alkaline reagent test: With sodium hydroxide solution, an intense yellow color is formed, which turns colorless on adding a few drops of dilute HCl, indicating the presence of flavonoids.

Zinc hydrochloride test: To the test solution, add a mixture of zinc dust and concentrated HCl; it gives a red color after a few minutes.

3. **Test for Tannins**

Ferric chloride test: On adding ferric chloride solution, a green color appears if condensed tannins are present.

Lead acetate test: With lead acetate solution, the test solution gives a white precipitate, indicating the presence of tannins.

4. **Test for Amino Acids (Ninhydrine test):** Add ninhydrine to the test solution and boil; it gives a violet color if amino acids are present.

5. **Test for Starch:** By adding a weak iodine solution to the aqueous solvent, a blue color appears, indicating the presence of starch, which disappears on heating.

6. **Test for Glycosides (Baljet's test):** Orange color with picric acid indicates the presence of cardiac glycosides.

7. **Test for Steroids and Triterpenoids**

Libermann-Burchard test: After adding a few drops of acetic anhydride to the test solution, boil and add concentrated sulfuric acid on cooling. If the upper layer turns green, it shows the presence of steroids, and the formation of a deep red color indicates the presence of triterpenoids.

Salkowski test: On treating the test solution with a few drops of concentrated sulphuric acid, if the lower layer turns red, it indicates the presence of steroids, and the formation of a yellow- colored lower layer indicates the presence of triterpenoids.

8. **Test for Proteins (Xanthoproteic test):** Treat the test solution with 1 ml concentrated nitric acid and boil; a yellow precipitate is formed, then add 40% sodium hydroxide solution; an orange color appears, confirming the protein's presence.

9. **Test for Alkaloids**

Mayer's test: Alkaloids gives a cream-colored precipitate with Mayer's reagent (potassium mercuric iodide).

Wagner's test: Alkaloids gives a reddish-brown precipitate with Wagner's reagent (iodine potassium iodide).

Hager's test: Alkaloids gives yellow precipitate with Hager's reagent (saturated solution of picric acid).

Tannic acid test: Alkaloids give a buff-colored precipitate with tannic acid solution.

10. **Test for Saponins (Froth formation test)**: Add 2 ml of test solution in water in a test tube and shake well. If persistent froth (foam) is formed, it indicates the presence of saponin.

Physicochemical analysis[10]

The physicochemical analysis helps in assessing the quality of the crude drugs. Biochemical variation, adulteration, substitution, effects of storage occurring in the drug can be tested. The foreign matter, moisture content / loss on drying, total ash, acid insoluble ash, water soluble ash, water soluble extractive and pH of the powdered sample were determined by using standard procedure mentioned in the context of the WHO guidelines for the assessment of herbal medicines. These guidelines provide a framework for ensuring the quality, safety and efficacy of herbal medicines. The reference values which is mentioned in API and the values obtained are tabulated in table no. 6.

RESULTS AND DISCUSSION

a. Phytochemical analysis

Table no. 5: Phytochemical analysis of *Haritamanjari* (*Acalypha indica Linn.)* in six different solvents.

Phytochemicals	Test performed	Solvents					
		Aqueous	Ethanol	Methanol	Hydroalcoholic.	Chloroform	Ether
Carbohydrate	Molisch's test	-	-	-	-	-	+
Flavonoid	Shinoda test	-	+	+	+	+	+
	Alkaline reagent test	+	-	-	-	+	+
	Zinc dust test	-	+	+	-	-	-
Tannin	Ferric chloride test	-	-	-	-	-	-
	Lead acetate test	+	+	-	+	-	-
Amino acid	Ninhydrine test	+	-	+	+	-	-
Starch	Iodine test	-	-	-	-	-	-
Glycoside	Baljet's test	+	-	-	+	-	-
Steroid	Libermann's Burchard test	-	-	+	-	-	-
	Salkowski test	-	-	-	-	+	-
Triterpenoid	Libermann's Burchard test	-	-	+	-	-	-
	Salkowski test	-	-	+	-	+	-
Protein	Xanthoproteic test	+	+	+	+	+	+
Alkaloid	Mayer's test	+	+	+	-	-	-
	Wagner's test	-	+	+	-	-	-
	Hager's test	+	-	+	-	-	-
	Tannic acid test	+	-	-	+	-	-
Saponin	Froth test	-	-	-	-	-	-

The phytochemical analysis of the *Haritamanjari* whole plant revealed the presence of various phytochemicals in different solvent mediums because of the differences in polarity. Flavonoids were seen with the Shinoda test in all solvents except aqueous; with the alkaline reagent test, the result was present in aqueous, chloroform, and ether solvents, while with the zinc dust test, it appeared in ethanol and methanol solvents. Carbohydrates appeared only in ether extract, suggesting that the plant may have contained rare non-polar carbohydrate derivatives. Amino acids were found in polar solvents, i.e., aqueous, methanol, and hydroalcoholic solvents, aligning with their water solubility. Proteins were seen in all solvents, suggesting their broad solubility. The presence of alkaloids was found in a polar medium, i.e., in ethanol and methanol solvents, confirming its good solubility. Triterpenoids

and steroids showed their presence in methanol and chloroform, suggesting their low polarity, while glycosides and tannins were present in aqueous and hydroalcoholic solvents. Saponins and starch were absent in all media.

b. Physicochemical analysis

Table no. 6: Physicochemical analysis of *Haritamanjari* (*Acalypha indica Linn.*) with standard values of API.

Parameters	Result (% w/w)	API standards
Foreign matter	1.4	NMT 2%
Moisture content (Loss on drying)	6.7	NMT 8-10%
Total ash	9.5	NMT 14%
Acid insoluble ash	1.9	NMT 2%
Water soluble ash	37	NLT 3%
Water soluble extractive	24.5	NLT 10%
pH	6.2	5.5-7

The physicochemical parameters, i.e., foreign matter, moisture content, total ash, acid-insoluble ash, water-soluble ash, and water-soluble extractive values obtained, were within the API standards, which not only assures the good quality of the sample but also suggests that the collected plant material is free from impurities and adulteration and is suitable for further pharmacological and formulation studies.

CONCLUSION

The study confirms the presence of multiple active constituents like flavanoid, tannin, proteins and alkaloids in the whole plant of *Haritamanjari* (*Acalypha indica Linn.)* and supports its traditional therapeutic claims. The physicochemical values indicate good quality and unadulterated plant material. The results assure its involvement in pharmacological research and standardization protocols for Ayurvedic formulations. However, more clinical and pathological studies is needed to be conducted to investigate the unexploited potential of the plant.

REFERENCES

1. ShribhavaMisra, Bhavaprakasa, Parishishtha Adhyay, Edited by Chunekar K.C. Reprint Edition, Chaukhambha Bharti Academy, Varanasi, 2022; 811.
2. Warrier, P. K., Nambiar, V. P. K., & Ramankutty, C., Indian Medicinal Plants: A Compendium of 500 Species, Volume 1. Orient Longman; 32.
3. Research, W. J. o P. a M. (2021, January 5). ETHNOMEDICINAL USES OF

ACALYPHA INDICA L. IN WESTERN ODISHA, INDIA. https://doi.org/10.17605/OSF.IO/A9ZF7.

4. K.M. Nadkarni, Indian plants and drugs, reprint edition Asiatic Publishing House, Delhi, 2007; 10-11.
5. Bapalal G. Vaidhya, Nighantu Adarsha, Volume I, Chaukhambha Barati Academy, Varanasi, 1999; 445-446.
6. Chekuri, Sudhakar & Lingfa, Lali & Panjala, Shiva & Bindu, K. & Rani, Roja. Acalypha indica L. - an Important Medicinal Plant: A Brief Review of Its Pharmacological Properties and Restorative Potential. European Journal of Medicinal Plants, 2020; 1-10. 10.9734/ejmp/2020/v31i1130294.
7. The Ayurvedic Pharmacopoeia of India, part 1, Volume VI, Reprint Edition, Government of India ministry of health and family welfare, New Delhi, 2001; 63-64.
8. Dr. Hema sane, Botany of commonly used medicinal plants, First edition, Vision Publication, Pune, 2014; 299.
9. Dr. K.R. Khandelwal, Practical Pharmacognosy, Preliminary Phytochemical Screening, Edition Twenty-eight, Nirali Prakashan, Pune, July 2017; 25.3-25.6.
10. World Health Organization (Geneva). Determination of ash, determination of extractable matter, quality control methods, material. Delhi: AITBS Publishers and Distributers, 2004; 34-39.