



Received on 16 December 2015; received in revised form, 20 January 2016; accepted, 26 January 2016; published 29 February 2016

PHARMACOGNOSTIC STUDIES ON ROOTS OF *TRIANTHEMA DECANDRA* LINN. AIZOACEAE

Veeresh^{*1}, Pramod Kumar² and V Rama Mohan Gupta³

Department of Pharmacognosy Smt. Sarojini Ramulamma College of Pharmacy, Mahabubnagar - 509001, Telangana, India.

Department of Pharmacognosy², V. L. College of Pharmacy, Raichur - 584103, Karnataka. India.

Department of Pharmaceutics³, Pulla Reddy Institute of Pharmacy, Annaram (V), Hyderabad - 500028, Telangana, India.

Keywords:

Trianthema decandra root,
Pharmacognostic study,
Phytochemical screening,
Standardization

Correspondence to Author:

Veeresh

Department of Pharmacognosy Smt.
Sarojini Ramulamma College of
Pharmacy, Mahabubnagar - 509001,
Telangana, India.

E-mail: getveereshyadav@yahoo.co.in

ABSTRACT: *Trianthema decandra* Linn., belongs to family Aizoaceae, commonly known as “Punarnavi” in Sanskrit, “Gadabandi” in Hindi, and “Vellai sharuni” in Tamil. This plant is globally distributed tropical and subtropical regions. In India, it grows in dry-soil lands. It has been known since ancient times for curative properties and has been utilized for treatment of various ailments such as burns and wounds. The roots are aperients and said to be useful in hepatitis, asthma, and suppression of the menses. A decoction of the root-bark is given as an aperients. The juice of the leaves dropped into the nostrils relieves one-sided headache.¹ In the present investigation, the detailed Pharmacognostic study of *Trianthema decandra* root is carried out to lay down the standards, which could be useful in future Forensic identification of unknown plant material. **Results:** The study includes macroscopic, microscopic, preliminary phytochemical screening and physicochemical evaluation. The objective this was to characterize the unknown plant material. **Conclusion:** In recent years there has been a rapid increase in the standardization of selected medicinal plant of potential therapeutic significance. Despite the modern techniques, identification of plant drug by Pharmacognostic study is more reliable.

INTRODUCTION: *Trianthema decandra* Linn. commonly known as Gadabani and vellai sharuni, belonging to family Aizoaceae is considered as a weed herb plant small evergreen tree found in tropical and sub-tropical parts of India.² Stems are elongate, prostrate, not much branched, angular striate, and glabrous.

Leaves subfleshy, 2-3.8 by 0.6- 1.6 cm, the opposite pairs somewhat unequal, elliptic-oblong, rounded and usually apices late at the apex; petioles 6-13 mm. long puberulous much dilated and amplexicaul at the base, but not enclosing the flowers.

Flowers in dense axillary subumbellated clusters; peduncles and pedicels very short, bracteoles thinly membranous. Calyx 4 mm. long, tube very short, lobes much longer than the tube, oblong, obtuse, with scarinum margins and with a distinct long apiculation at the back below the apex. Stamens 10. Styles 2.



Capsules not enclosed in the tube of the calyx, 4-seeded, the cap very truncate, 3 mm long, solid, subcylindric with a narrow acute rim round its base, carrying away 2 seeds. Seeds orbicular-reniform, striate, black³.

In the traditional Indian system of medicine, the Ayurveda and various folk system of medicine, *Trianthea decandra* possess several medicinal properties such as toothache, analgesic, anti-inflammatory, anti-diabetic and other skin disorders⁴ etc. Chemical studies have shown that, the presence of Carbohydrates, Alkaloids, Steroids, Tannins, Fats, Oils and Saponins⁵.

The current article describes some pharmacognostical, physicochemical and phytochemical characteristics studied. The primary objective of this study is to supplement valuable information with regards to its identification, Characterization, and standardization of plant *Trianthea decandra* Linn.

MATERIAL AND METHODS:

Collection of Sample: The fresh plant parts of *Trianthea decandra* was collected and authenticated by Dr. K. Madhava Shetty, Assistant Professor, Dept. of Botany, S. V. University, Tirupathi, A. P. The plant herbarium was prepared (PRIP-01/13) and deposited in the Department of Pharmacognosy, Pulla Reddy Institute of Pharmacy for further reference. The fresh root parts were used for the study of macroscopical and microscopical characters; whereas the dried root powder was used for determination of powder microscopy and phytochemical analysis.

RESULTS AND DISCUSSION:

Macroscopic Description:

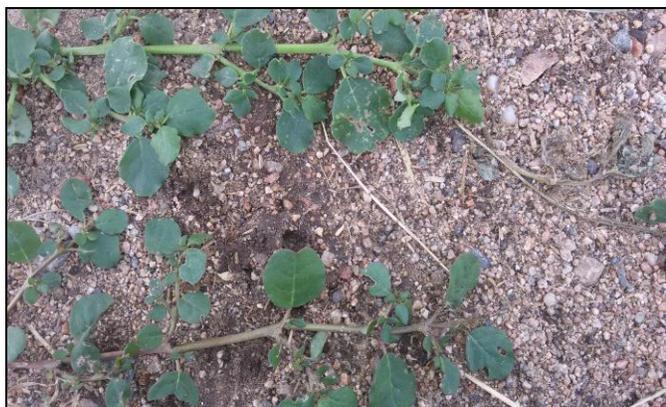


FIG. 1: *TRIANTHEMA DECANDRA* PLANT



FIG. 2: *TRIANTHEMA DECANDRA* ROOT

Macroscopic Description: The roots of *Trianthea decandra* Linn. was subjected to macroscopic studies which comprised of organoleptic characteristics viz. color, odor, appearance, taste, shape, texture, fracture, etc. of the drug. These parameters are considered as quite useful in quality control of the crude drug and were evaluated as per standard WHO guidelines^{6,7,8}.

Microscopic Characteristics^{9, 10}: Fresh roots of *Trianthea decandra* were used for this purpose. Photographs of different magnifications were taken with Nikon Labphot 2 Microscopic Unit. For normal observation bright field was used. For study crystals, starch grains and lignified cells, polarized light was employed. The scale-bars indicate magnification of the figures. Descriptive terms of the anatomical features are as given in the Standard books (Easu, 1964).

Determination of Powder Characteristics:^{11, 12}

Powder Microscopy: Shade-dried roots were powdered with the help of an electric grinder till a fine powder was obtained. This fine powder of root was subjected to powder microscopy, as per standard procedures mentioned. Powder of root is taken in a watch glass. Equal quantities of phloroglucinol and hydrochloric acid were taken in the watch glass. The slide was prepared with the help of a brush. Focused under a microscope.

Phytochemical Investigations:^{13, 14, 15} The qualitative chemical tests carried out for the identification of the different phytoconstituents present in the powdered crude drug by using methods of Kokate (1996) and Khandelwal (2005).

Trianthema decandra is a prostrate weed with branches up to 2 m long, distributed in the tropical & sub-tropical regions of the world. The macromorphological evolution of Roots showed thin, slender, tapering, and tortuous, with lateral

branching fibrous root, 4-12 cm in length; 0.2-1.8 cm in diameter, light yellow externally, creamish white internally, fractures fibrous. Odour is strong & characteristic, and the taste is bitter & disagreeable.



FIG. 2: TRANSVERSE SECTION OF ROOT
Rth: Root hairs; Ep: Epidermis; Pr: Periderm

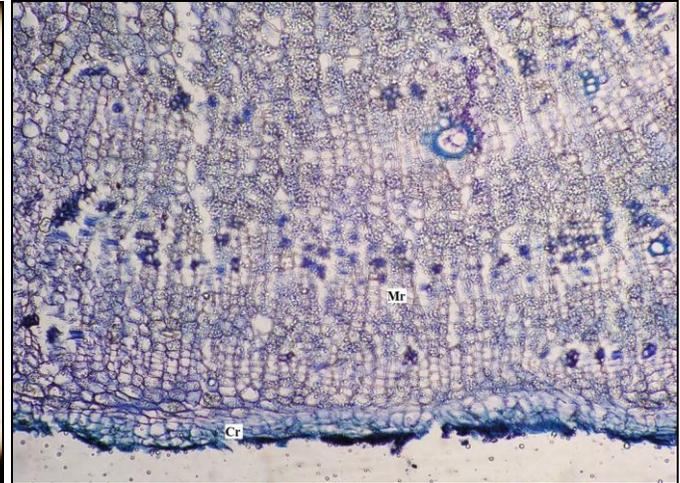


FIG. 3: Cr: Cork cells; Mr: Medullary rays

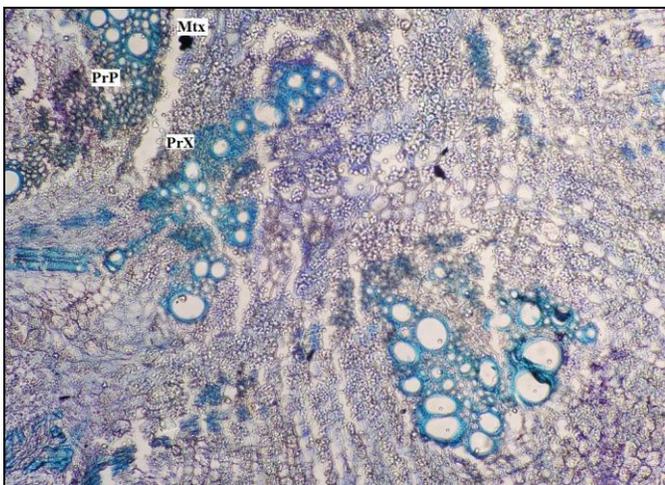


FIG. 5: Mtx: Metaxylem; Prx: Protoxylem; Prp: Primary phloem

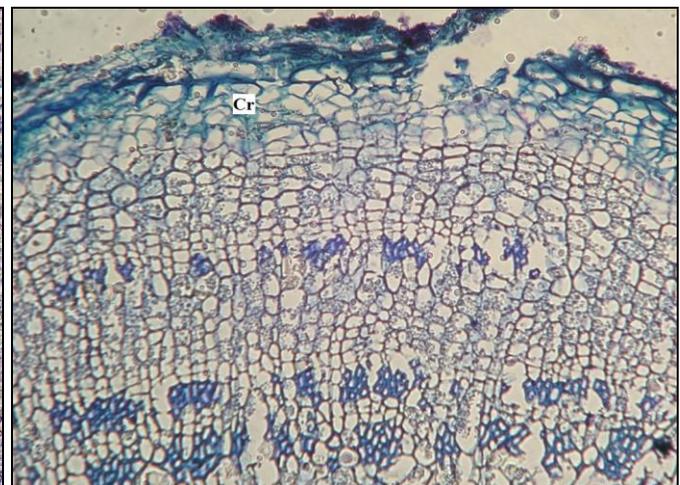


FIG. 6: Cr: Cork Cells; Mr: Medullary rays

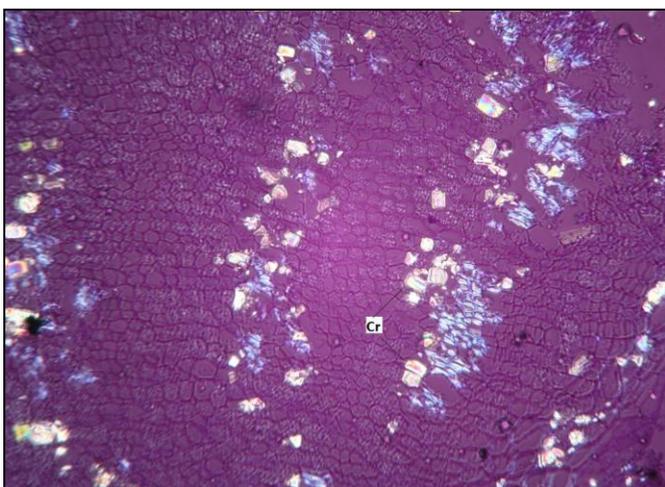


FIG. 7: Cr: Crystals

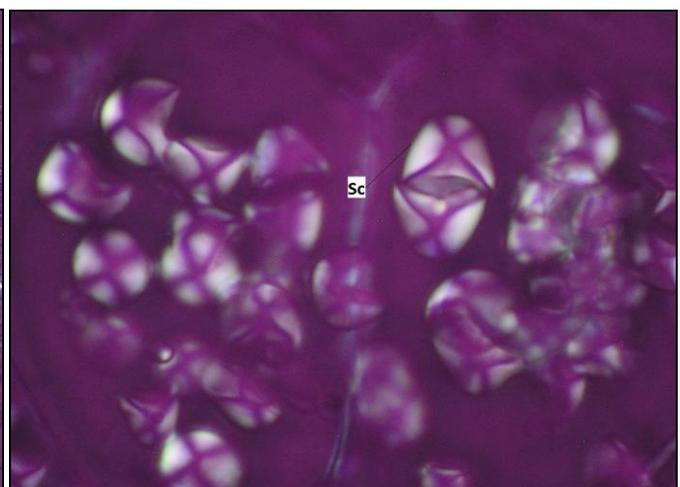


FIG. 8: Sc: Scleritis

Determination of Powder Characteristics:

Powder Microscopy: The microscopic examination of the powder shows fragments of the fibrous layer, Root hairs, Epidermal cells,

Sclerenchyma, Xylem vessels, cortex, Parenchymatous mass, Calcium oxalate crystals, Phloem fibers, and other cell contents **Fig. 9**.

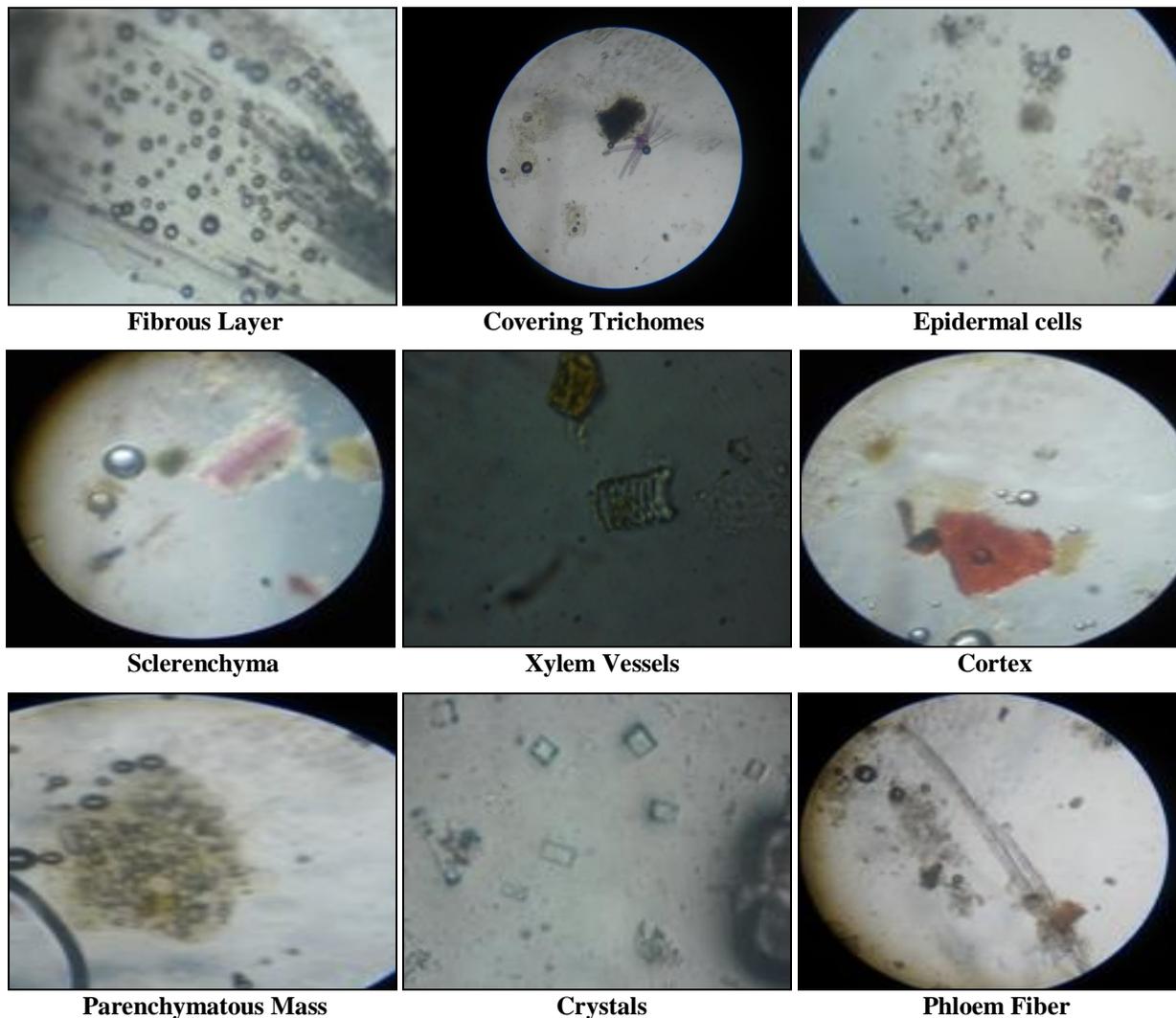


FIG. 8: POWDER MICROSCOPY

Physicochemical Evaluation: The results of the physicochemical constants of raw material lie within the limit which is mentioned in **Table 1**.

This signifies that the quality and purity of raw material was good enough.

TABLE 1: PHYSICOCHEMICAL ANALYSIS

Parameters	Results
Total Ash	5.5%
Acid-insoluble Ash	0.8%
Water Soluble Ash	2.5%
Sulfated ash	1%
Alcohol Soluble Extractive	2.8%
Water Soluble Extractive	2.32%
Loos on drying	8.25%
Crude Fibre Content	0.5%

Phytochemical Investigations: The crude extracts obtained from the pilot scale extraction were subjected to Phytochemical screening; the results

show the presence of Carbohydrates, Glycosides, Flavonoids, Alkaloids, Steroids, Saponins, etc. **Table 2**.

TABLE 2: PHYTOCHEMICAL SCREENING OF DIFFERENT EXTRACTS OF *TRIANTHEMA DECANDRA* LINN.

S. no.	Constituents	Extracts					
		Pet. Ether	Chloroform	Acetone	Methanol	Ethanol	Aqueous
1	Carbohydrates	+	+	+	+	+	+
2	Glycosides	+	+	-	+	-	-
3	Flavonoids	+	-	+	-	-	-
4	Alkaloids	-	+	+	+	+	+
5	Steroids	+	-	-	+	+	-
6	Fats and oils	+	+	+	+	+	-
7	Saponins	-	-	+	+	+	+

Fluorescence Analysis: The results of fluorescence analysis were expressed in **Table 3**. Fluorescence study is an essential parameter for the first line standardization of crude drug. In fluorescence, the fluorescent light is always of

greater wavelength than the exciting light. Light rich in short wavelength is very active in producing fluorescence, and for this reason, UV light produces fluorescence in many substances which do not contain visible fluorescence in daylight.

TABLE 3: UV FLUORESCENCE ANALYSIS

Extract	Sunlight	UV light	
		254 nm	365nm
Pet. Ether	Green	Golden green	Brown
Chloroform	Green	Brown	Dark Brown
Acetone	Dark Green	Light Brown	Dark Browns
Methanol	Light brown	Green	Dark green
Ethanol	Light brown	Green	Dark green
Aqueous	Brown	Light green	Light brown

ACKNOWLEDGEMENT: The authors are thankful to the Dr. P. Balraj garu, Chairman and Ms. P Ushasree, Director of Smt. Sarojini Ramulamma College of Pharmacy, Mahabubnagar for providing necessary facilities to carry out the research work.

The authors are also thankful to Dr. K Madhava Chetty, Asst. Professor, Department of Botany, Sri Venkateshwara University, Tirupati-Andhra Pradesh for identifying and authentication of the plant *Trianthema decandra* Linn.

CONFLICT OF INTEREST: Nil

REFERENCES:

- Jeyaprakash K, Ayyanar M, Geetha KN and Sekar T: Traditional uses of medicinal plants among the tribal people in Theni District (Western Ghats), Southern India. Asian Pacific Journal of Tropical Biomedicine 2011; S20-S25.
- Geethalakshmi R, Sarada DVL and Ramasamy K: *Trianthema decandra* L: A review on its phytochemical and pharmacological profile. International Journal of Engineering Science and Technology 2010; 2(5): 976-979.
- Nadkarni K.M. Indian Medicinal Plants. Bombay popular prakashan Pvt. Ltd., Mumbai 2004; 2: 1182.
- Fabricant DS and Farnsworth NR: The value of plants used in traditional medicine for drug discovery. Environ Health Perspect 2001; 109: 69-75.
- Gopalakrishnan S and Venkataraman R: Comparative Pharmacognostic studies of genuine and commercial samples of *Trianthema decandra* Linn. Ancient Science of life 2000; 20(1-2): 33-43.
- Kokate CK: Practical Pharmacognosy. 4th ed. Delhi. Vallabh Prakashan 1997: 107-111.
- Khandelwal KR: Practical Pharmacognosy Techniques and Experiments. 15th ed. Pune. Nirali Prakashan 2006: 15-163.
- Wallis TE: Text Book of Pharmacognosy. 5th ed. Delhi. CBS Publishers and Distributors 2005: 104-158.
- The Indian pharmacopeia. Ghaziabad 2007; 1: 78.
- Sarma K, Krishna R, Ramakrishna VSS, Gourinath A: Intermediate First Year Botany. Telugu Academic Publication. Hyderabad 2004.
- Kokate CK: Practical Pharmacognosy. Vallabh Vrakashan. Delhi 2008.
- Kokate CK, Purohit AP and Gokhale SB: Pharmacognosy. 36th ed. Nirali Prakashan; Pune 2006.
- World Health Organization. Quality control methods for medicinal plant materials. WHO/PHARM/92.559; 1998: 4-46.
- Harborne JB: Phytochemical methods. Second edition, Chapman & Hall. London and New York. ISBN 0-412-25350-2.1984:288.
- Arya V, Gupta R and Gupta VK: Pharmacognostic and Phytochemical Investigation on *Pyrus pashia* Buch. Journal of Chemical and Pharmaceutical Research 2011; 3(3): 447-456.

How to cite this article:

Veeresh, Kumar P and Gupta VRM: Pharmacognostic studies on roots of *Trianthema decandra* linn., Aizoaceae. Int J Pharmacognosy 2016; 3(2): 103-08. doi link: [http://dx.doi.org/10.13040/IJPSR.0975-8232.IJP.3\(2\).103-08](http://dx.doi.org/10.13040/IJPSR.0975-8232.IJP.3(2).103-08).

This Journal licensed under a Creative Commons Attribution-Non-commercial-Share Alike 3.0 Unported License.

This article can be downloaded to **ANDROID OS** based mobile. Scan QR Code using Code/Bar Scanner from your mobile. (Scanners are available on Google Playstore)