AUGUST-SEPTEMBER-2016

VOLUME 1 ISSUE 1

PIJAR

PARYESHANA

INTERNATIONAL JOURNAL OF AYURVEDIC RESEARCH

www.pijar.in

Pharmacognostical and Phytochemical evaluation of Kshudragnimantha (*Clerodendrum phlomidis Linn)*

Shweta Kulkarni, MD (Ayu)[1] Dr. Mayuresh Agte MD (AYU)[2]
Dr. (mrs) Sumitra patil. BAMS., MD (AYU) [3]

[1]Assistant Professor, Dept. of Dravyaguna,PNPS Ayurvedic Medical College & Research Centre Parkalai, Kerala. [2]Professor and HOD, PG Dept. of Dravyaguna ,[3] Professor, Dept of Dravyaguna- shri. J. G. Co-operative hospital society's, Ayurvedic medical college Ghataprabha.

ABSTRACT

Clerodendrum phlomidis Linn is an important and well known medicinal plant extensively used in Ayurveda and Siddha system of medicine for treatment of various ailments. The popular therapies include Shotha (inflammation), Meha, Vatavyadhi, Yakshma, Agnimandya, and Mutravyadhis as well as a bitter tonic.

The alcoholic and aqueous extracts of Kshudragnimantha were reported active as Analgesic, Antidiarrhoeal, Antiplasmodial, Hypoglycemic, Minortranquilizers, Anti-asthmatic, Antifungal, Nematicidal, Anti-amnestic and Anti-arthritic

Key Words: Clerodendrum phlomidis Linn, Kshudragnimantha, Extract

Introduction:

Ayurveda is a holistic system that promotes health of the body, mind and spirit. Ayurveda, which is upaveda of Atharvaveda, is the ancient medical science of India, which not only imparts vast knowledge of drugs and diseases but also gives guidelines to mankind about the art of living and perfect health.

Certain sources also suggest that origin of Ayurveda began from those things which were observed from nature (Eg: vomiting of cat using certain grasses in certain aeinments etc). Nature has proved very useful and worthful for human life. Especially the biological environment, which includes plant kingdom. Almost all the plants of the universe are useful as told in the verse below.

"Sarvam dravyam aushadibhutham"

Aushodha or Drugs is one among three pillars of Ayurveda. Ayurvedic therapeutics can again be classified into Dravya buta and Adravya buta according to the line of treatment. The Dravya bhuta therapeutics is once again classified into three types. They are:

1) Herbal origin
2) Animal origin
3) Mineral origin

The study of these drugs is branched into a subject known as Dravya guna Vignyana. The origin of Dravya guna Vignyana is as old as Ayurveda. Though it is not separately dealt as an anga of Ayurveda and enumerated as one among the eight anga but it is having scattered references in all its branches or Angas.

Clerodendrum phlomidis Linn is an important and well known medicinal plant extensively used in Ayurveda and Siddha system of medicine for treatment of various ailments. The popular therapies include Shotha (inflammation), Meha, Vatavyadhi, Yakshma, Agnimandya, and Mutravyadhis as well as a bitter tonic.

Drug Profile:

निरुक्ति [5]

- तर्कारि–तर्कम् रुच्छति इति ।

It attracts the persons due to its good qualities or it is frequently discussed/ praised by many people.

- नादेयी–नद्यान् भवा इति ।

It is available widely besides the river bank or near the river bank.

- वैजयन्तिका–वैजयन्ति पताका एव इति ।

It is flag bearer on behalf of all the plants.

- गणिकरिका–गणा सन्त्यस्या:इति । गणम् समुहमित्यार्ति इति गणिकारि ।

It has bushy appearance so called Ganikarika or it acts against the group of disease, or this tree can easily be picked up even from group of plants because of its great therapeutic quality.

- अग्निमन्थिनी–अग्निम् मथ्नाति मन्थविलोडने। अग्नये मथ्यति इति वा।

The branch is used to produce fire by rubbing it with another branch.

- जया ट्टजयन्ती जयती इति ।

It will win over the diseases

- तनुत्वचा–तनुः तन्वो त्वक् वल्कलमस्याः।

It has thin bark so called Tanutvacha**.**

- तेजोवृक्ष–तेजोयुक्त वृक्षः । अग्न्युत्पादकत्वादस्य तथात्वम्।

It produces the fire or it has Teja in it so called Tejovruksha**.**

- तपन–तपतिती।

As it produces heat.

- अरणी–अरण्यां भव इति अरणी ।

It grows usually in the forests.

- गन्धपुष्पा–गन्धाढ्यं पुष्पमस्याः।

Flower of this plant contains pleasant smell.

GUNA-KARMA [3,4]

Table-1 Showing Gunas of Kshudragnimanth

रस	कटु तिक्त कषाय मधुर
गुण	लघु रुक्ष
वीर्य	उष्ण
विपाक	कटू
दोषघ्नता	वातहर
	कफहर

Its use in the treatment of Prameha, Vatakaphajakarnashoola, Ashmairi, etc and its qualities are similar to the qualities of Agnimantha, with its Vipaka as Katu and Virya as Ushna. Having Gunas, Laghu, Ruksha and Rasas mainly Katu, tikta all this qualities act as Kaphavatahara.

Botanical Name:-

Clerodendrum phlomidis Linn.

CHARACTERISTICS [3,4]

Habit-A large bush or small tree, reaching 9 meter high, with more or less pubescent branches. **Leaves**-3.8-6.3 by 3.2 -3.8 cm, ovate or sub rhomboid, obtuse or acute, coarsely crenate-dentate or sub entire, undulate, and glabrous above more or less puberulous beneath, base truncate or sub chordate ; **Petioles** -6-20 mm long. **Flowers** - Moderate sized, fragrant, in small dichotomous axillary cymes arranged so as to form a rounded terminal panicle; bracts –obovate or lanceolate, acute leafy. Calyx 1 cm. long or more , divided about half way down,glabrous,not enlarged in fruit ; segments ovate , acutely acuminate, veined.

Corolla- White or pinkish , tube 2-2.5 cm long ,slightly pubescent outside, glabrous inside ; lobes nearly equal , exceeding 6 mm long ,elliptic , obtuse , veined. Filament slightly pubescent below. **Ovary-** And style glabrous. Drupe 6 mm long, broadly obovoid, depressed the top about level with points of the persistent calyx-lobes, normally 4 – lobed with pyrene in each lobe.

AIMS AND OBJECTIVES

1. Pharmacognostical study
2. Preliminary phytochemical analysis of Kshudragnimanth of Leaf & root

Materials & Method:

PHARMACOGNOSTICAL STUDY

1. Organoleptic evaluation of drug
2. Physicochemical evaluation of drug
3. Qualitative chemical tests

1. ORGANOLEPTIC EVALUATION OF DRUG:

Macroscopic characters of leaf and root of Kshudragnimanth (Clerodendrum phlomidis Linn), for the colour, odour, taste and shape are studied.

2. PHYSICOCHEMICAL EVALUATION OF DRUG:

Ash Values

Total ash

5 gms of crude drug powder was accurately weighed in a tared silica dish previously ignited and weighed. Incinerated gradually by increasing the heat, not exceeding dull red heat, until free from carbon, cooled and weighed. The percentage of ash was calculated with reference to the air-dried drug.

Acid-insoluble ash

The ash was boiled for 10 minutes with 25 ml of dilute hydrochloric acid, and the insoluble matter was collected in a gooch crucible. It was washed with hot water, ignited, and weighed. The percentage of acid-insoluble ash was calculated with reference to the air-dried drug.

Water-soluble ash

The total ash was boiled for 5 minutes with 25 ml of water. The insoluble matter was collected in a gooch crucible. It was washed with hot water, ignited, and weighed. The percentage of water-soluble ash was calculated with reference to the air-dried drug.

Determination of alcohol soluble extractives:

Procedure**:**

- Macerate 5 g of the air dried drug, coarsely powdered, with 100 ml of Alcohol of the specified strength in a closed flask for twenty-four hours, shaking frequently during six hours and allowing standing for eighteen hours.
- Filter rapidly, taking precautions against loss of solvent, evaporate 25 ml of the filtrate to dryness in a tared flat bottomed shallow dish, and dry at 105º, to constant weight and weigh.
- Calculate the percentage of alcohol-soluble extractive with reference to the air-dried drug.

Determination of water soluble extractives:

Proceed as directed for the determination of Alcohol-soluble extractive, using chloroform water instead of ethanol.

Moisture Content

- Weigh 10 gms of fresh drug into clean tared flat bottomed shallow dish, which is dried at 105ºand weighed.
- Keep the drug into hot air oven at 105^0 till all the moisture content is evaporated.
- Cool it in a desiccator and weigh.
- The loss in weight is usually recorded as moisture content.

3. **QUALITATIVE CHEMICAL TESTS:**

Table No. 2: Showing Preliminary Phytochemical Screening

Sl. No	Tests	Criteria
I.	**Test for alkaloids**	
	Dragendorff's Test	Orange brown precipitate
	Wagner's test	Reddish brown precipitate
	Hager's Test	Yellow precipitate
	Mayer's Test	Cream precipitate
II.	**Test for Carbohydrates and Glycosides**	
	Molish's test	Purple to violet colour ring
	Fehlings solution Test	Brick red precipitate
	Benedict's solution test	Reddish brown ppt
	Barford's solution test	Red ppt
III	**Tests for Proteins and Aminoacids**	
	Millon's Test	White precipitate turns red on heating
	Ninhydrin solution Test	Violet colour
IV	**Tests for Phenolic compounds and Tannins**	
	Ferric chloride solution	Blue green colour
	Sodium hydroxide	Yellow to red ppt
V	**Test for Phytosterols and Triterpenoids**	
	Liebermann's Buchard's Test	Deep red colour
	Salkowski reaction	Red colour
VI	**Test for flavonoids**	
	Shindoda test	Pink colour
VII.	**Test for Saponin**	
	Foam test	1 cm foam layer

THIN LAYER CHROMATOGRAPHY

PROCEDURE

Take a beaker with watch glass, and pour the solvent into the beaker to a depth of just less than 0.5 cm. and then using a pencil, draw a line across the pre-coated Silica gel plate carefully at the 0.5 cm mark. The spot arising above this level is taken into consideration. Dissolve sample to be analyzed in a few drops of a volatile solvent such as hexanes, ethyl acetate, or methylene chloride. Spot the solution to be analyzed (10µl per spot) by using capillary pipette on TLC plate origin and wait for dry. Repeat the procedure 3 times. Place the prepared TLC plate in the developing beaker, cover the beaker with the watch glass, and leave it undisturbed on your bench top. Run until the solvent is about half a centimeter below the top of the plate. Quickly mark a line across the plate at the solvent front with a pencil.

Visualize the spots - Allow the solvent to evaporate completely from the silica plate. If the spots are colored, simply mark them with a pencil. Most samples are not colored and need to be visualized with a UV lamp. Hold a UV lamp over the plate and mark any spots, which you see lightly with a pencil.

Refraction Value (Rf) - Measure and record the distance of each spot from the point of its application and calculate the Rf value by dividing the distance traveled by the spots by the distance traveled by the front of the mobile phase.

DETERMINATION OF pH

EQUIPMENT: Digital calibrate pH meter

50 ml of distilled water is taken in beaker, digital pH meter is immersed upto the maximum immersion level. Allowed the reading to stabilize and using a screw driver turned the P^H calibration trimmer to read 7.0.

Then 5 gms of c.p. extract (leaf and root separately) was added with 50 ml of distilled water in a beaker, stirred well with glass rod gently, at uniform suspension digital P^H meter was immersed, observed for maximum immersion and readings were recorded.

Observations & Results

PHARMACOGNOSTIC STUDY

TABLE NO 3. Showing macroscopic characters of Kshudragnimanth leaf and root

SL.NO	CHARACTERS	LEAF	ROOT
1.	Biological source	Leaf	Root
2.	Organoleptic characters		
A	Colour	Upper surface is dark green and lower surface is pale green in colour.	Yellowish brown
B	Odour	Bitter	Fragrant
C	Taste	Bitter, astrigent	Bitter, astrigent
D	Shape	Obtuse or acute, sometime sub-rhomboid	Cylindrical
E	Touch	Upper surface smooth,lower surface rough	Smooth

TABLE NO 4: Anatomical characteristics of Kshudragnimanth Leaf and Root

CHARACTERS	LEAF	ROOT
Shape	Obtuse or acute, sometime sub-rhomboid.	Cylindrical,occasionally branched
Length and width	3.9-6.5× 3 -3.7 cm	7-15cm long and 0.2-3cmin diameter
Features	—	Yellowish brown externally, thin bark, rough outer surface, light yellow wood, hard fracture
Phyllotaxy	Opposite leaves arise in pairs, rarely alternate.	—
Apex	Acute	—
Margin	Undulate –crenate or sub entire	—
Venation	Reticulate ,unicostate type ,4-8 pairs of secondary nerves	—
Dorsi-ventral leaf	glabrous above more or less puberulous beneath	—
Base	truncate or sub chordate, exstipulated	—

MICROSCOPICAL STUDY

LEAF

- Lamina is dorsiventral.
- Non glandular trichomes are slightly warty.
- Glandular trichomes with one celled stalk and 4-8 celled head.
- Cruciferous type of stomata.
- Large number of open collateral vascular bundle.

ROOT

- Exfoliating cork.
- Rhomboidal crystal of calcium oxalate packed in xylem parenchyma and xylem rays.
- Secondary xylem shows a wide zone, consisting of usual elements, all being lignified; vessels found in single as well as in groups of 2-3,scattered throughout xylem region;
- Xylem parenchyma simple pitted, squarish wide lumen; xylem rays 1-5 seriate, consisting of radially elongated cells; abundant simple,round starch grains, found scattered throughout.

PHYSICO – CHEMICAL STUDY:

SOLUBILITY TESTS

TABLE NO 5. Values of water soluble extractives of Kshudragnimanth Leaf and Root

SL.NO	OBSERVED	LEAF	ROOT
1.	Percentage of water soluble extractives in the plant	67.2%	8%

TABLE NO 6. Values of alcohol soluble extractives of Kshudragnimanth Leaf and Root

SL.NO	OBSERVED	LEAF	ROOT
1.	Percentage of alcohol soluble extractives in the plant	18.4%	5.6 %

MOISTURE CONTENT

TABLE NO 7: Moisture Content of Kshudragnimanth Leaf and Root

LEAF	ROOT
77.2%	**42.6%**

ASH VALUES

TABLE NO 8: Ash values of Kshudragnimanth Leaf and Root

SL.NO	OBSERVED	LEAF	ROOT
1.	Total ash	24%	3.5%
2.	Acid insoluble ash	5%	0.5%
3.	Water soluble ash	15.5%	3%

Table No.9: Observation of pH Value

OBSERVATION	VALUE
Distal. Water Normal pH	7.0
Acidic media pH	0 to 7
Alkaline Media pH	7 to 14
Clerodendrum Phlomidis Leaf	6.7 approx
Clerodendrum Phlomidis Root	6 approx

PRELIMINARY PHYTOCHEMICAL STUDY

TABLE NO 10. Observation and Results of Chemical Tests for Detection of Chemical Constituents:

SL. NO	TESTS	OBSERVATION	RESULTS	
			LEAF	ROOT
I	**Test for alkaloids**			
	Dragendorff's Test	No ppt found	-VE	-VE
	Wagner's test	Reddish brown precipitate	+VE	+VE
	Hager's Test	Yellow precipitate	+VE	+VE
	Mayer's Test	Cream precipitate	+VE	+VE
II	**Test for Carbohydrates, Glycosides**			
	Molish's test	Purple to violet colour ring not seen	-VE	-VE

	Fehlings solution Test	Brick red precipitate not seen	-VE	-VE
	Benedicts solution test	No ppt seen	-VE	-VE
	Barford`s reagent test	No ppt seen	-VE	-VE
III	**Test for Phytosterols and Triterpenoids**			
	Liebermann's Buchard's Test	Deep red colour seen	+VE	+VE
	Salkowski reaction	Red colour seen	+VE	+VE
VI	**Tests for Proteins and Aminoacids**			
	Millon's Test	No white ppt	-VE	-VE
	Ninhydrin solution Test	Absence of violet colour	-VE	-VE
V	**Tests for Phenolic compounds and Tannins**			
	Ferric chloride solution	Blue green colour	+VE	+VE
	Solution+ sodium hydroxide	Yellow to red ppt	+VE	+VE
VI	**Test for flavonoids**			
	Schinoda test	Pink colour seen	+VE	+VE
VII	**Test for Saponin**			
	Foam Test	1 cm foam layer seen	+VE	+VE

TABLE NO 11: Observation and result of TLC

Plate size	20x8 cm
Technique	One way ascending
Temperature	30^0 C
Examination	Day light after spraying
Plate thickness	3 mm
Activation temp	110 c
Time	30 min –1 hr
Detection of spots	UV chamber
Adsorbent layer	Silica gel G (Activated) percolated plates.

TLC: As the water extract is only used for the study when applied for the TLC it showed clubbing of bands. Therefore it was very difficult to differentiate the bands of the components.

Discussion:

The Preliminary Phytochemical analyses were carried out for both the trial drugs in the Dravyaguna Laboratory of Shri. J. G. Co-op Hospital Society's Ayurvedic

Medical College, Ghataprabha. Organoleptic characters of both the drugs under trial were found similar with the description mentioned in classics. The standards for purity and identity of root are mentioned in the Ayurvedic Pharmacopeia of India but not of leaf. The standard methods mentioned in Ayurvedic Pharmacopeia of India were followed under strict supervision. The results were obtained as mentioned

The physical standards of leaf are not mentioned in API and APF but the botanical description are found very near to the characters mentioned in Indian medicinal plants (Kirtikar & Basu Vol 3 Page No.1945, 1947). The structural and physical standards of both trial drugs are found very near to the values mentioned in API (Part 1 Vol. 3 Page No. 3-4). Thus the Kshudragnimantha leaf and root are genuine and hence of good quality and purity.

It is found that the Tests are positive for alkaloids, tannins, sterols, triterpenoides and saponin. Kshudragnimantha leaf is having alkaloids, sterols and tannins and it is rich in Saponins. Kshudragnimantha root is also rich in alkaloids, sterols and tannins and it is rich in Saponins

Conclusion

The phytochemical screening and analytical standards shows that the drug is genuine and of good quality & purity, both (leaf and root) trail drug were found rich in sterols, tannins, alkaloids

References:

1. Acharya Kaiyadeva-"Kaiyadeva Nighantu" (Pathyapathyavibodhaka) Oshadhi varga/ 27 edited and translated by Prof. P.V. Sharma and Dr. Guruprasad Sharma, published by Chaukhambha Orientalia Varanasi, 1st edition 1979. (Pp 8)
2. Acharya Pandit Narahari-"Rajanighantu" prabhadradi varga/24-25 edited with Dravyagunaprakashika hindi commentary by Dr. Indradeo Tripathi, Published by Krishnadas academy Varanasi 2nd edition 1998. (Pp- 268)
3. Dr. C.K.Kokate, Practical Pharmacognosy, reprint-2006, Vallabh prakashana.

4. Anonymus- Wealth of India, Vol-2, pp no.69, reprint-2003, publication- Council of scientific and Industrial Research New Delhi. (Pp no.107-111,123-124)
5. Namarupa vignanam – Prof. P.V.Sharma,. 1st Edition 2000Satyapriya Prakashan Varanasi. . (Pp 69)

CORRESPONDING AUTHOR
Dr Shweta Kulkarni
MD (Ayu)
Assistant Professor, Dept of Dravyaguna,
PNPS Ayurvedic Medical College Parkalai,
Kanhangad Dt: Kasargod. Kerala

drshk77@gmgil.com

Source of Support: NIL
Conflict of Interest : None declared