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Research Article

PHARMACOGNOSTICAL AND PHYSICOCHEMICAL STUDY OF ROOT OF *ABUTILON RANADEI* (SON GHANTA).

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ABSTRACT:

In recent era Ayurveda got prime importance because of its broad spectrum view towards life, nature, natural remedies. According to Charakacharya every drug can be used as a medicine if appropriate knowledge is applied so one of the drug is selected for primary analysis i.e. Pharmacognostical and physicochemical study of root of Son Ghanta (*Abutilon ranadei*) which belongs to the family Malvaceae and Genus *Abutilon* which is not studied yet. Detail study is discussed further.

KEY WORDS: *Son Ghanta*, Pharmacognostical, physicochemical study.

INTRODUCTION:

Ayurveda called as a panchamaveda, a sub type of Rigveda among the four Vedas. Ayurveda describes etiology of diseases and their treatment part. The drugs i.e. vanaspaties used for that purpose has been mentioned in classical texts like Bruhatrayis, Laghutrayis and many more in scattered manner.

Still there are so many drugs on this earth yet to be studied whose properties are unknown. They are medicinally useful or not. The study on those drugs should be done. As time passes right from Vedic era to this century time to time there is introduction of newer drugs in Ayurveda through various Nighantus. There are so many examples of drugs which are recently introduced in and now widely used as they are medicinally useful. The Nighantus plays major role in it.

By applying appropriate knowledge every drug or herb can be used as a medicine is as described as in Charaksamhita-

“नानौशधिभूतं जगत्किंचितद्रव्यमउपलभ्यते ।
तांतां युक्तिमर्थं चतंतमअभिप्रेत ॥ च.सू. 26/12

i.e. there is no any drug available in this world which does not possess the property of medicine, only there is necessity to apply appropriate knowledge.

To introduce the same, the drug *Abutilon ranadei* medicinal uses of it not mentioned yet is chosen for study. Current study reveals the pharmacognostical structure and physico chemical constituents present in the plant.

MATERIALS AND METHODS:

1. Collection of Sample:
2. Authentication
3. Standardization.
4. Analytical Study.

Collection and Authentication:

The collection of root of *Abutilon ranadei* was done in March 2015 from the region of Kolhapur District. Then these were authenticated at central research facility, Analytical laboratory.

Roots collected washed under running water, cut in

pieces, shade dried (covered with cloth) in dry place and used for preparation of powder. Son Ghanta root powder was stored in non-contaminated airtight plastic container before taking for further study in lab.

Plant morphology:

Figure 1



Abutilon ranadei plant

Figure 3



Abutilon ranadei root

Figure 2



Abutilon ranadei flower

Figure 4



Abutilon ranadei root surface

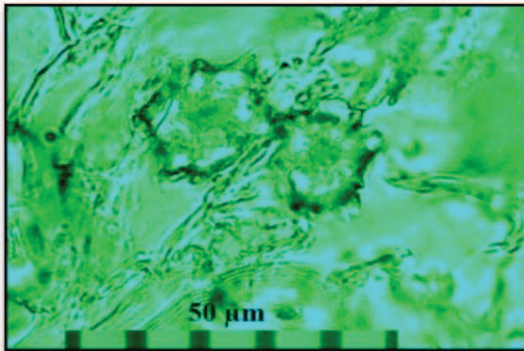
OBSERVATION, RESULTS AND DISCUSSION:

Observation is divided in to following 4 parts-

1. Pharmacognostical study
2. Physicochemical study
3. Phytochemical study
4. Study for heavy metals

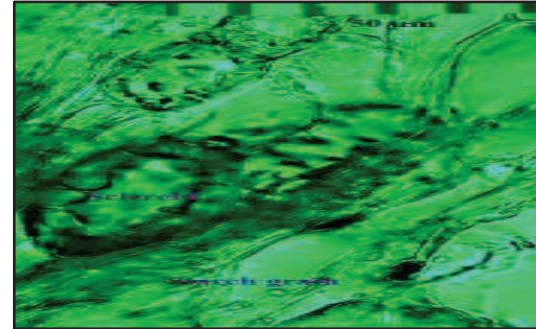
Microscopic structures of root of *Abutilon ranadei*:

Figure 5



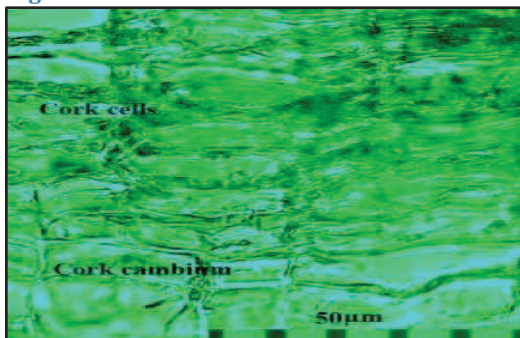
Cluster of crystal in secondary cortex

Figure 9



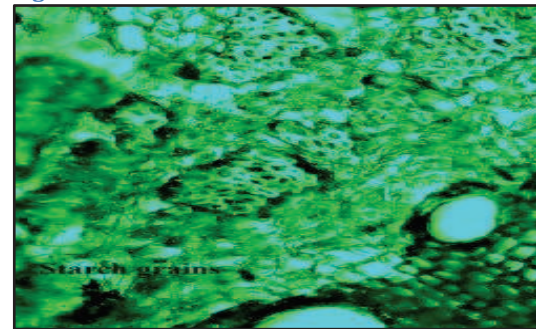
Sclereid and starch in secondary cortex

Figure 6



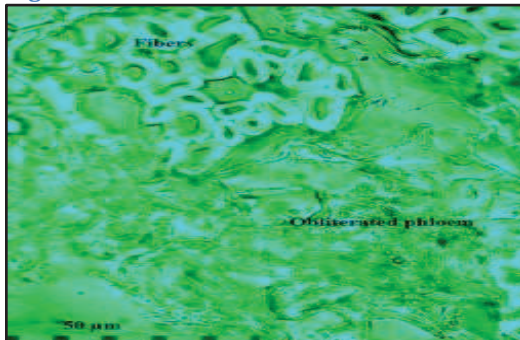
Cork and cork cambium

Figure 10



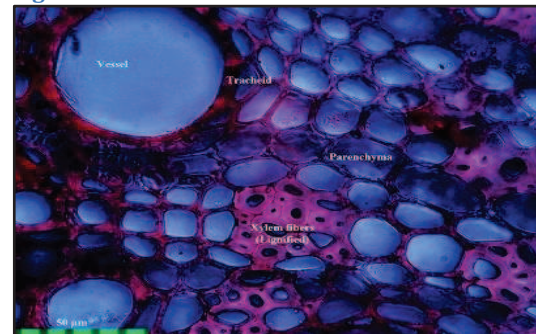
Starch grains treated with iodine

Figure 7



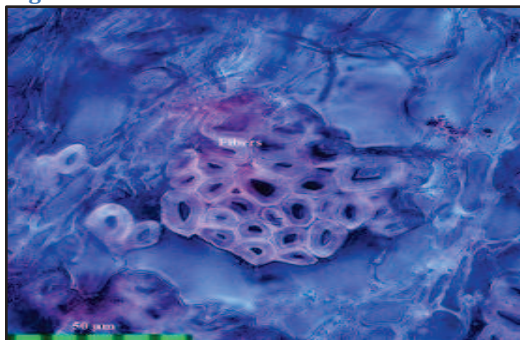
Fibers and obliterated phloem

Figure 11



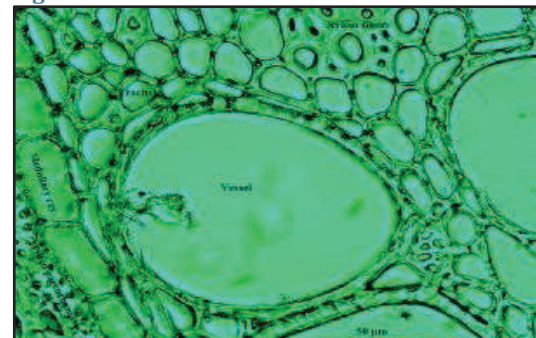
Xylem elements under UV light

Figure 8



Non-lignified fibers of secondary phloem

Figure 12



Xylem elements

1. Pharmacognostical observations:

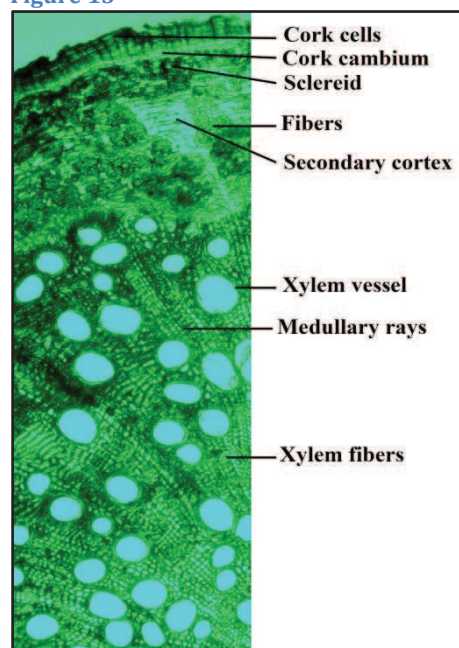
This includes Macroscopic, Microscopic Characters, and Organoleptic Characters.

Abutilon ranadei* Woodrow and Stapf.*Macroscopic Characters:**

It is a tap root with branches and adventitious roots. The diameter of root ranges 1-2 cm. It is creamish-green externally while internally creamish-white in colour. Surface is with broken longitudinally linings. Bark is easily peeling off in fakes. Taste of root sweet and astringent while odor is characteristic.

Microscopic Characters:

The outline of transverse section is almost circular. The detailed of TS shows 6-15 layered tangentially elongated cork cells with cork cambium. Secondary cortex is composed of rectangular cells. Medullary rays reaches to upper secondary cortex at places. Clusters of crystals are present in this secondary cortex and sometimes in cork cells too. Thick walled sclereids are present in patches in upper portion of secondary cortex. Throughout the secondary cortex phloem fibers are present. The walls of vessels are reticulated with double bordered pits. Medullary rays 2-3layered and consists of radially elongated cells. Many of them are pitted. Both simple and compound starch grains are present in throughout parenchyma cells.

Outline of T.S. of *Abutilon ranadei* root.**Figure 13****Powder Size:****Microscopic**

Abutilon ranadei 3 μ m – 300 μ m

Sieve size (number and aperture size in μ m)	<i>Abutilon ranadei</i>
# 355 (number)	All powder passes
# 180 (number)	65.45 % passes

Powder of root is in between moderately fine to fine.

Foreign matters:

Abutilon ranadei: 0.25%

***Abutilon ranadei* Woodrow and Stapf. Powder:**

The powder is creamish-white coloured fine to moderately fine with sweet taste and characteristic odour. It is mealy to fibrous in touch. Under compound microscope it shows fragments of reticulated vessels, fragments of phloem fibers (non-lignified), fragments of tracheids, fragments lignified fibers adhered with tracheids in surface view. Fragments of cork cells, parenchyma cells and sclereids of various shapes and sizes are seen in both sectional and surface view. Both simple and compound starch grains were observed, however quantity was more for simple starch grains. Clusters of crystals are seen.

Organoleptic characters:**Root:**

	<i>Abutilon ranadei</i>
Colour	Brownish-green to creamish green externally and cream to white coloured internally
Odor	Characteristic (Sweetish)
Taste	Sweetish with salt touch
Texture	Rough, flaky with cream coloured inside, having marks of adventitious roots
Fracture	Fibrous

Powder:

	<i>Abutilon ranadei</i>
Colour	Creamish-white
Odor	Characteristic to none
Taste	Sweet
Touch	Mealy and fibrous

2. Physicochemical study:

Parameters	Abutilon ranadei
Loss on Drying at 105°C	6.90%
Total Ash	8.12%
Acid Insoluble Ash	1.75%
Water Soluble Ash	3.78%
Alcohol Soluble Extractives	5.52%
Water Soluble Extractives	12.55%
pH (10% w/v solution)	5.13 ±0.10

Sr. No	Rf Values	Color Under Visible Light	Color Under Long UV
1	0.28	Pale yellow	Fluorescent blue
2	0.39	-	Blue
3	0.51	-	Pale yellow
4	0.61	-	Pale yellowish green
5	0.83	-	Blue

3) Phytochemical study:**Preliminary Phytochemical Tests**

Sr. No	Compounds	Abutilon ranadei	
		Tests	Remarks
1	Carbohydrates	+ve	Less
2	Protein	+ve	Less
3	Alkaloids	+ve	Abundant
4	Glycosides	+ve	Abundant
5	Flavonoid	+ve	Moderate
6	Tannin	+ve	Abundant
7	Steroids	+ve	Abundant
8	Triterpenoides	+ve	Moderate

Abutilon ranadei: After spray with Ninhydrin Solution

Sr. No	Rf Values	Color Under Visible Light	Color Under Long UV
1	0.28	Pink Pale	fluorescent blue
2	0.39	Pale pink Pale	fluorescent blue
3	0.51	Pale creamish purple	Pale blue
4	0.61	Creamish mud	Pale blue
5	0.83	-	Pale pink

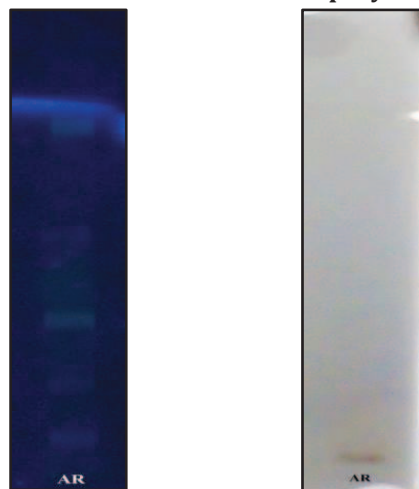
4)Thin Layer Chromatography:

Solvent System: Ethyl acetate: Formic acid: Water: 8:0.8:1.2

Extraction: Methanolic Extract

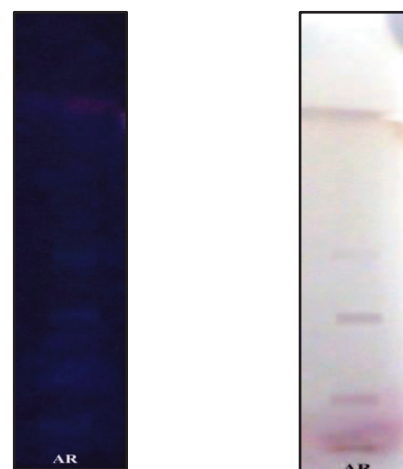
Spraying Agent1: Ninhydrin Solution

Spraying Agent 2: Dragendorff's Reagent

Abutilon ranadei: Before spray

Under long UV

Under Visible Light

After spray with Ninhydrin Solution

Under Long UV

Under Visible Light

***Abutilon Ranadei*: After spray with Dragendorff's Reagent:**

Sr.No	Rf Values	Color Under Visible Light	Color Under Long UV
1	0.15	Dark orange	Fluorescent blue
2	0.46	Light brown	Fluorescent green
3	0.51	-	Light fluorescent blue
4	0.81	Brown	Greenish brown

After spray with Dragendorff's Reagent



Under Long UV



Under Visible Light

Quantitative Assessment Of Heavy Metals:

Heavy Metals	Abutilon ranadei
Mercury (Hg)	0.3 mg/kg
Lead (Pb)	0.55 mg/kg
Arsenic (As)	0.38 mg/kg
Cadmium (Cd)	0.02 mg/kg

RESULTS AND CONCLUSION:

The pharmacognostical, physicochemical phytochemical and Heavy metal tests are carried out there in Pharmacognosy, under microscope cross sectional view root and powder it shows the presence of cork cell, cortex, sclerides, fibres, Starch grains. etc The physicochemical, phytochemical, Heavy metals test reveals *Abutilon ranadei* has Carbohydrates, proteins, alkaloids, Glycosides, Tannin, Steroids, present, no significant presence of heavy metals.

Scope for Further Research:

The primary analytical study of *Abutilon ranadei* root can be used as a reference for further study for medicinal purpose.

References:

- 1) The Ayurvedic Pharmacopoeia of India, Government of India, Ministry of Health and Family Welfare, Department of Health, New Delhi, Part I Vol-I Edition 2001
- 2) Flora of Kolhapur District, S.R. Yadav and M.M.Sardesai, 2002
www.kew.org/science-conservation

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