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Pharmacognostical and Phytochemical Evaluation of stem of *Abutilon indicum* (Linn.)

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ABSTRACT
Abutilon indicum (Linn) family (*Malvaceae*) commonly known as Atibala is used in our Traditional System of Medicine for healing various diseases. It is used in the treatment of piles, uterine discharge, febrifuge and in cases of pulmonary tuberculosis. In the present investigation an attempt was made to study its Pharmacognostical features, including macroscopic, microscopic features, physico-chemical parameters, Quantitative analysis and to investigated the phytochemical present in the extracts in the preliminary level. Thus it was thought worthwhile to explore the plant on the basis of its standardization parameters. The study will provide referential information for the correct identification of the crude drug.

Keywords: *Abutilon indicum*, Standardization, microscopy, phytochemical analysis.

INTRODUCTION

Alternative System of Medicine like Ayurveda, Siddha, Unani and Traditional Chines Medicine has gain its importance in the recent few years for its high potential in curing various disease with lesser side effects as compared with the synthetic drugs. These are due to the mainly presence of the secondary metabolites like proteins, flavonoids, alkaloids, steroids and phenolic substances which are in turn used to restore health and heal many diseases**.** .Natural products of plant and animal origin offer vast resource of newer medicinal agents with potential in clinical use.

Abutilon indicum (Linn) family *Malvaceae*, commonly known as Atibala is an important medicinal plant used in our Traditional System of Medicine to treat various health aliments. The plant is used as demulcent, aphrodisiac, laxative, diuretic, pulmonary and sedative. The leaves are used as astringent [1], bark is used as diuretic and seeds are used as laxative, expectorant and demulcent. [2] The plant contains mucilage, tannins, asparagines, gallic acid and sesquiterpenes. [3]Thus the present investigation was aimed at evaluating the pharmacognostical features and phytochemical analysis for authentication and identification of the plant and also to evaluate the exact extract responsible for the biological activity.

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MATERIALS AND METHODS

Plant Material

The fresh stems of the plant *Abutilon indicum* were collected from the wild sources of the Dhulia district of Maharashtra, in the month of July and were identified from the authentic sources. The collected stems were washed; shade dried and was pulverized with a mechanical pulverizer for the size reduction. It was then passed through Mesh no: 100 and the fine powder was collected and was used for the experiment for powder microscopy and preparation of extract. The fresh stem sample was used for the microscopy identification.

Pharmacognostical Studies

Morphological studies were done by simple visualizing with naked eye to determine the surface, texture, Fracture, taste, colour and odour of the stem. Microscopic studies were done by preparing a thin section of the stem region of *Abutilon indicum*. The section was cleared with chloral hydrate solution and was stained with different chemicals to observe the changes in the cells. Histochemical reactions were carried out by Concentrated Hydrochloric acid and phloroglucinol mounted in glycerin for the identification of lignified elements, iodine solution for identification of starch grains, ruthenium red for mucilage, 60 % sulphuric acid for calcium oxalate crystals and ferric chloride for the phenolic compounds in the powdered bark by reported methods. [4-5]
As a part of quantitative microscopy, length and width of

trichomes and lignified fibers were determined by using fresh stem powder of the plant.

Physico-chemical parameters

The parameter were done to evaluate the percentage of Total ash, water soluble ash, acid insoluble ash and sulphated ash were calculated as per Indian Pharmacopoeia. [6] Extract of the powdered stem was prepared with different solvents for the study of extractive value. Flurosecne analysis was also carried out for the powder as well as for different extracts.

Powder Analysis

Preliminary analysis of the powder of stem of *Abutilon indicum* was carried out with different chemical reagents. [7-8]

Preliminary Phytochemical Analysis

For Preliminary phytochemical analysis, extract was prepared by weighing 1 kg of the dried powdered stem and were subjected to hot successive continuous extraction with different solvents as per the polarity, methanol, hydro alcoholic and finally with aqueous. The extracts were filtered in each step, concentrated and the solvent was removed by rotary evaporator. The extracts were dried over dessicator and the residues were weighed. The presence or absence of the primary and secondary phytoconstituents was detected by usual prescribed methods. [9]

Table 1: Flurosence Analysis of the powdered stem of *Abutlion indicum*

S. No.	Sample	Colour in day Light	Colour in Short UV 256 nm	Colour in Long UV 480 nm
1.	Powder	Light Brown	Pale Yellow	Yellowish brown
2.	Powder + Sodium Hydroxide 0.1 N	Yellow	Pale Yellow	Yellowish Black
3.	Powder +2 M Hydrochloric acid	Light Brown	Pale Yellow	Brown
4.	Powder + Water	Light Brown	Pale Yellow	Dark Yellow
5.	Powder + Acetone	Pale Yellow	Pale Yellow	Pale Yellow
6.	Powder + Acetic Anhydride	Pale Brown	Lemon Yellow	Light Brown

Table 2: Physicochemical Evaluation of the crude drug *Abutlion indicum*

S. No.	Standardization Parameters	% w/w
1.	Total Ash	13
2.	Acid Insoluble Ash	0.33
3.	Water Soluble Ash	10
4.	Water Insoluble Ash	3
5.	Alcohol Soluble Extractive Value	1.6
6.	Water Soluble Extractive Value	21.6
7.	Loss on Drying	11.37

Table 3: Quantitative Analysis of leaf constants of *Abutlion indicum*

S. No.	Particulars	Values (µm)
1.	Length of Fibers	206.25
2.	Width of Fibers	10
3.	Length of Trichomes	150.56
4.	Width of Trichomes	6.75

Table 4: Flurosence Analysis of the stem extract of *Abutlion indicum*

S. No.	Sample	Colour in day Light	Colour in Short UV 365 nm	Colour in Long UV 480 nm
1.	Petroleum Ether Extract	Pale Brown	Emerald Green	Orange
2.	Ethyl Acetate Extract	Pale Brown	Greenish Yellow	Brown
3.	Chloroform Extract	Pale Yellow	Emerald Green	Yellowish Brown
4.	Methanolic Extract	Greenish Yellow	Light Green	Brownish Yellow
5.	Hydro- Alcoholic Extract	Brown	Emerald Green	Dark Brown
6.	Aqueous Extract	Brown	Greenish Yellow	Brown

Table 5: Preliminary Phytochemical Screening of Stem Extract of *Abutlion indicum*

S. No.	Test	Methanolic Extract	Hydro-Alcoholic Extract	Aqueous Extract
1.	Alkaloids	-	-	-
2.	Carbohydrateds	+	+	+
3.	Flavonoids	+	+	+
4.	Glycosides	+	-	+
5.	Phenolic Compounds	+	+	+
6.	Saponins	-	-	-
7.	Steroids	-	+	+
8.	Sterols	-	-	-
9.	Tannins	+	+	+
10.	Gums	-	-	-

RESULTS

The macroscopical studies of stem revealed certain characters:

Fracture: Regular

Shape: Cylindrical

Texture: Smooth and bulbous.

Surface: Fine and smooth.

Colour: Pale yellow.

Taste: Characteristic

Odour: Odourless.

Microscopy

The Transverse section should the following characteristic features: The outer region consisted of epidermis and was made up of elongated continuous cells. To the epidermis trichomes were observed which unicellular, uniserate in nature. This is rarely seen in this species of plant. The next region was the arrangement of parenchyma cells which were closely packed and were arranged in 8-9 layers. Below this layer the arrangement of pericyclic fibers were seen. The vascular bundles were arranged radically consisted of 6-7 layers of xylem. Both lignified and nonlignified fibers were observed in this region. The central potion consisted of pith made up of tightly packed parenchyma cells.In between the vascular bindles and pith loosely packed collenchyma cells were observed and shown in Fig. 1.

Powder Microscopy

The powder was characterized on its morphological features as colour: pale yellow, odour: odourless and taste was characteristic in nature

The dried fine powder was stained with chloral hydrate to detect the presence of calcium oxalate crystals. They were prismatic in nature. When stained with phloroglucinol and concentrated hydrochloric acid vascular bundles, spiral vessels, parenchyma cells, lignified fibers and non lignified fibers were observed.

With glycerin mounting trichomes were observed which were of covering. All the results are figured in Fig. 2a, 2b, 2c and 2d respectively

Fluorescence Analysis

The powder was subject to fluorescence analysis as per the standard procedure and shown in Table 1.

Physico-chemical Parameters

The powdered drug was evaluated for its physico-chemical parameters like Ash values: Acid Insoluble ash, Water soluble ash, Water Insoluble ash, Extractive values (Alcohol and water soluble values) and loss on drying. All the results are tabulated in Table 2.

Quantitative Analysis

The fresh stem samples were subjected to quantitative analysis for length and breath of fibers of both lignified and

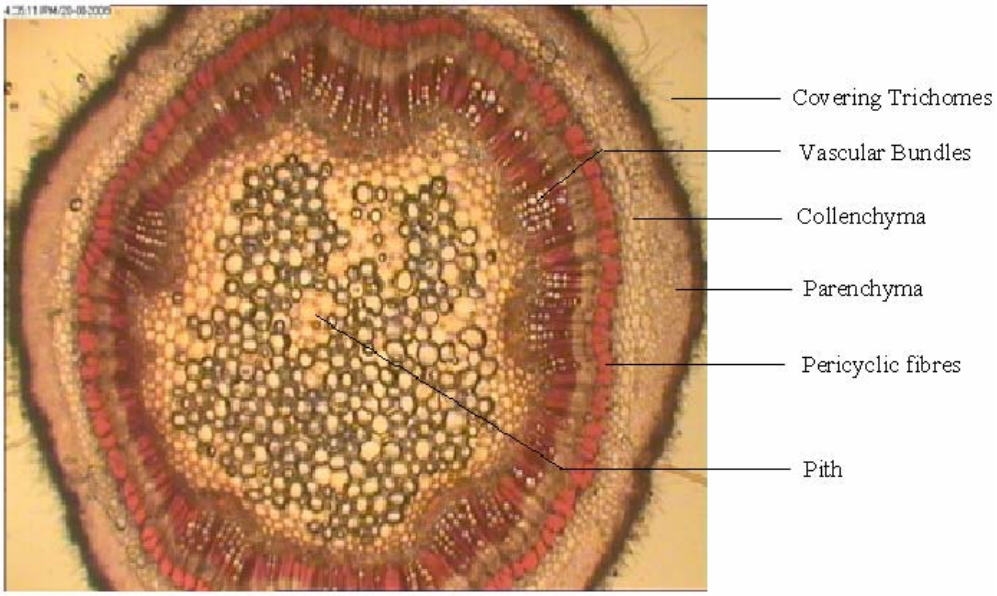

Fig. 1: Transverse Section of stem of *Abutilon indicum*

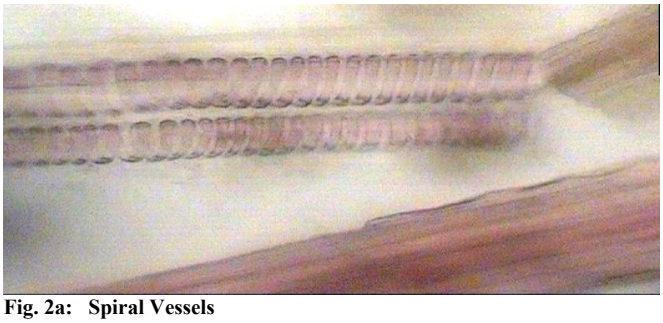

Fig. 2a: Spiral Vessels

Fig. 2b: Covering Trichomes

Fig. 2c: Calcium Oxalate Prisms

Fig. 2d: Non- Lignified Fibers

non lignified and trichomes. The results are shown in Table 3.

Fluorescence Analysis of the extracts

The extracts were prepared as per their polarity in hot successive extraction technique. Further they were treated with reagents and the colour changes were observed under Ultr Violet light. All the results are tabulated in Table 4.

Preliminary Phytochemical Analysis

The various extracts were subjected to preliminary phytoconstituents analysis for their presence or absence of the constituents. The results are shown in Table 5.

DISCUSSION

Now a day the standardization of crude drugs has become very important for identification and authentication of a drug. But due to certain problems the importance was not up to the mark. Thus the lack of standardization techniques fails to identify the drug from its originality which thereby exploits the usage of drug from its Traditional System of Medicine. The plant *Abutilon indicum* is used widely from its ancient time for curing many diseases and gives a helping hand to the humans. Thus a perfect protocol was designed for its authentication and identification on the basis of microscopy and chemical analysis. Thus the present investigation was aimed and the results were found to be significant and encouraging towards the goal for standardization.

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