PHARMACOGNOSTIC STUDY OF *Abutilon indicum* (L.) Sweet

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ABSTRACT:

Abutilon indicum (L.) Sweet is erect much branched, woody, under shrub of family Malvaceae, commonly called Shikka. The leaves of this plant is used by Andh, Gond, Naikede, Pradhan and Kolam tribes of Mahur range forest of Nanded district to treat bronchitis, diarrhea, inflammation of the bladder, chronic inflammation of urethra and urinary bladder. Pharmacognostic studies of leaves drug is carried out for evaluation of drug and to detect the adulteration. It includes dermal characters like stomata, trichomes and anatomical features etc. The plant was analyzed for its preliminary screening of phytochemicals. The result reveals that the presence of bioactive constituents comprising flavonoids, tannins and saponins.

Keywards: *Abutilon indicum (L.) Sweet , pharmacognostic studies, Mahur forest*.

INTRODUCTION

Abutilon indicum (L.) Sweet is much branched, woody, erect, under shrubs, hoary tomentose. It grows up to 1 to 2.5 meters high. Flowers are solitary, axillary; peduncles 3.5 to 5 cm long. Sepal five united; lobes ovate. Petals are five yellow, obovate, toothed at apex. (Fig. 5).

The plants are distributed in all parts of Marathwada and abundantly occur in Mahur range forest, cultivated field, grassland and wasteland.

The plant is used in folk medicine by the rustics and tribal people of Mahur range forest for the treatment of bronchitis, diarrhea, inflammation of the bladder, chronic inflammation of urethra and urinary bladder etc. The leaves possesses medicinal properties that are used to treat rheumatism, urinary tract infection and kidney stone, dental problems, toothache, piles, tuberculosis and stomachache and other elements (Rahmatullah *et al.,* 2009; Pradeep Kumanr 2014; Prachi *et al*., 2009 and Immanuel and Elizabeth, 2009).; Alagesaboopathi (2009). Therefore, the preliminary phytochemical investigation is necessary to prove proclaimed ethnomedicinal uses.

MATERIAL AND METHODS

a)Plant material:

The leaves of *Abutilon indicum* (L.) Sweet were collected from Mahur range forest of Nanded district, Maharashtra. The collected plant material was taxonomically identified by using standard floras Naik (1979), Naik *et al* (1998), Chetty *et al*. (2008)., Yadav and Sirdesai (2002). The voucher specimen of plant was preserved in Department of Botany, Dnyanopasak College, Parbhani. Leaves were shade dried and powdered. The leaf powder was successively extracted with different solvent. The fresh leaves and stem were used for the study of macroscopic and microscopic characters.

b) Preliminary phytochemical Screening:

The leaf extract of *Abutilon indicum* (L.) Sweet in methanol solvents were undertaken by using standard methods for the detection of secondary phytoconstituents like alkaloids, glycosides, flavonoids, tannins, saponins, terpenoids phlobatannins , anthraquinones, reducing sugar and cardiac glycosides (Harborne, 1984).

c) Preparation of extract:

Leaves powder was subjected to soxhlet extraction with Methanol (64.5-65.5^{0}c) solvents (Daniel, 1991). The extracted solvent is evaporated to make the final volume one fourth of its original volume. The extract is stored at 4^{0}c in airtight bottles for further study.

Pharmacognostic studies:

Macroscopic study:

Morphological studies were done using simple microscope. The shape, apex, base, margin, taste and odour of leaves powder were observed.

Microscopic studies:

The free hand transactions of leaves and stem were taken and stained by using double stained differential staining technique and mounted in DPX (Johanson, 1940). The cellular and anatomical illustrations were prepared by using camera lucida and some photographs were taken with the help of digital camera.

The leaf is peeled off for the study of stomata and the trichomes of upper and lower epidermis. For the study of vessels the stem is macerated by using Jeffery's fluid and stained with aqueous 1% saffranin and mounted in glycerine and made semi- permanent by ringing with DPX mountant.

The leaves powder was treated with phloroglucinol and HCl for the detection of lignin. Glycerin and iodine solution were used to determine calcium oxalate crystal and starch grains respectively. As a part of quantitative microscopy, stomatal number, stomatal index, vein islet number and vein termination number were determined by using fresh leaves of the plant (Kokate, 1997).

OBSERVATIONS

T. S. of Stem:

The transverse section of the stem is circular in outline. Epidermis is single layered composed of compactly arranged barrel-shaped parenchyma cells, which are highly cuticularised. Epidermis covered with uniseriate multicellular hairs. Beneath the epidermis collenchymatous hypodermis is followed by many layered loosely arranged parenchymatous cortex. Numerous conjoint, collateral open vascular bundles are present inner to the cortex and are arranged in a ring. Phloem is facing towards periphery. Xylem is endarch and is separated by medullary rays which are radially elongated compactly arranged parenchyma cells. At center, pith is made up of polygonal parenchyma cells without intercellular spaces (Fig No. 1).

T. S. of Leaf:

It is typical dicot leaf. Leaf anatomy shows upper and lower epidermis composed of rectangular compactly arranged cells. Both the surfaces covered with cuticle and hairs. The mesophyll is differentiated into palisade tissue and spongy parenchyma. Palisade tissue composed of two layers of closely arranged columnar cells they are present just below the upper epidermis. Just below the palisade tissue there are loosely arranged parenchymatous cells with intercellular spaces. Vascular bundle is conjoint, collateral and closed. Xylem is present towards the upper epidermis and the phloem towards the lower epidermis (Fig No. 2).

Stomata:

The leaf is simple rough, leaf lamina entire unicostate reticulate pattern of venation, the leaf is amphistomatic. The stomaties of both the surfaces are anomocytic, the guard cells are surrounded by five to six subsidiaries, which are morphologically corelated with epidermal cell (Fig 4).

Trichome:

The trichomes are present on both the adaxial and abaxial leaf surfaces. The trichomes are tufted or stellate with 9 or many arms and spread roughly parallel to the leaf surface. The arms arising from a common foot which is without protoplasmic content and spread roughly parallel to the leaf surface (Fig 3).

Vessels:

The vessel elements of secondary xylem show variation where 33% vessels are with spiral to scalriform thickening. Both end wall plates are oblique and multiperforate having size 80 mμ and diameter is 270 mμ lengths (Fig No. 6 C). About 33% vessels, the one end wall plate is transverse or oblique with simple perforation plates and other end wall is oblique with simple perforation plate. Lateral wall thickenings are spiral, the length is 380 mμ and diameter is 60 mμ. Remaining 33% vessels are short, lateral wall thickening is scalariform. One end wall is transverse with multiperforation plate while other end wall with oblique multiperforation plate, length is 230 mμ and diameter is 110 mμ (Fig No.6 A and B).

Phytochemical screening:

The Phytochemical screening of methanol leaf extracts of *Abutilon indicum* (L.) contain flavonoids, tannins and saponins. Whereas the alkaloids, glycosides, terpenoids, phlobatannins, anthraquinones, reducing sugar and cardiac glycosides were not detected (Table No.1).

Powder analysis:

The powder was characterized by its morphological features like green colour presence of specific odour and astringent taste. Microscopic study of powder reveals the presence of trichome, calcium oxalate crystal, xylem vessels and epidermal cells(Table No 2 and 3).

DISCUSSION AND CONCLUSION

The present study reveals that the extracts of leaves powder of *Abutilon indicum* (L.) contain flavonoids, tannins and saponins. These active agents could be promissory sources for drug development and thus validates the tribal folkloric claims. This assertion is also confirmed by pharmaceutical and antimicrobial studies, which could helpful in authentication of folkloric efficacy of the drug.

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Fig.1 T. S. of Stem

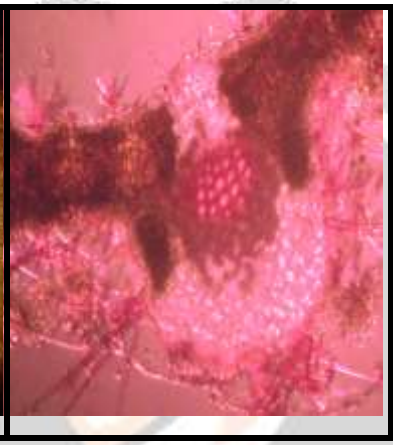


Fig. 2 T. S. of Leaf

Fig. 3 Trichomes

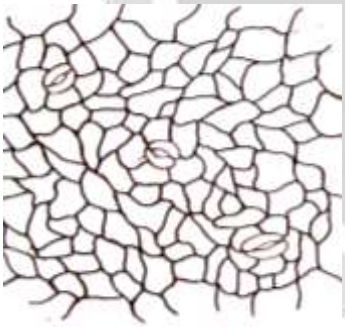
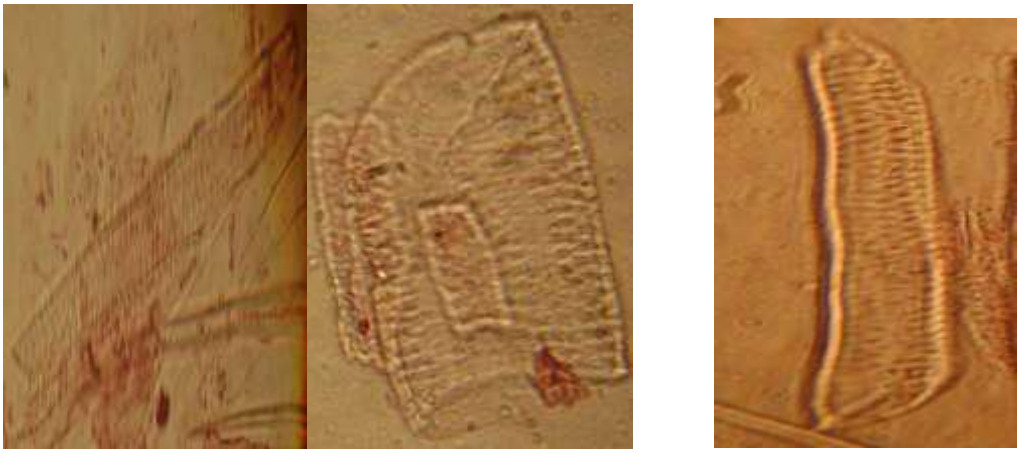


Fig. 4 A: Stomata upper epidermis B: lower epidermis

Fig. 5 *A. indicum*



A B C

Fig.6 Stem Vessels

Sr.no	Phytochemicals	Test	sr. no	Phytochemicals	Test
1	Alkaloid	-	6	Phlobatannins	-
2	Glycoside	-	7	Saponins	+
3	Flavonoids	+	8	Terpenoids	-
4	Tannins	+	9	Anthraquinones	-
5	Reducing sugar	-	10	Cardiacglycosides	-

Table No 1: Preliminary phytochemical screening of leaves powder

Sr No	Test	Observation	Inference
1	Colour	Green	Leaf drug
2	Odour	Specific	Aromatic crude drug
3	Taste	Astringent	Drug contain tannins

Table No. 2 : Macropscopic study of the drug

Sr No.	Reagent	Observation	Characteristic
1	Powder +Phloroglucinol+conc. HCl	Red or pink colour	Lignified cells of vascular bur
2	Powder +Ruthenium red	Pink colour	Mucilagenous cell of epidermis
3	Powder +Sudan red III	Pink colour	Cuticle
4	Powder +Acetic acid	Insoluble	Calcium oxalate crystal
5	Powder +Dil. Hydrochloric acid	Soluble	Calcium oxalate crystal
6	Powder +Conc.Sulphuric acid.	Green colour	Stone cell presnet
7	Powder +Dil. Iodine sloution	Blue	Starch in endodermis
8	Powder +Dil. Iodine solution +Conc. Sulphuric acid	Black colour	Hemicellulose absent

Table No 3: Flurosence analysis of the powdered leaf of *Abutilon indicum*

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