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Evaluation of Root and Leaf Extract of *Abutilon indicum* Linn. For Antifungal Activity

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Abstract

Currently the area of investigating and isolating the herbal drugs is gaining considerable importance and leading to evaluation of green chemicals. Many consumers preferred to treat themselves with phytopharmaceuticals or herbal preparation and the sale of these are increasing worldwide. The literatures have shown that different parts of plants have various pharmacologically active constituents in different amounts. The present study is aimed to carry out extraction of and pharmacological investigation on Root & Leaf extract of *Abutilon indicum Linn.* The present research work was performed to evaluate Root & Leaf extract of *Abutilon indicum Linn.* for their antifungal activity against varieties of fungi.

Keywords: *Abutilon indicum Linn*, Root and Leaf extract, Antifungal Activity.

Contents

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1. Introduction

A medicinal herb contains a number of chemical compounds which are responsible for medicinal activity and are called secondary metabolites. Since ancient time, plant- based product has been used for health care, search is continuing for new plant material and their interaction with biological system. Whenever such plant material is found to be useful, it is taken up for further investigation, as regards to the constituents present for its biological action. On confirmation of its biological activity, the suitable extracts or isolated phytoconstituents are prepared from the plant material and put into usage.[1]. Currently this is an area, which is gaining considerable importance and leading to evaluation of green chemicals. Many consumers preferred to treat themselves with phytopharmaceuticals or herbal preparation and the sale of these are increasing in most first world countries. All these have led to the development of new field called herbal drugs extraction. Many manufacturers are making efforts to improve yields, as well as composition of total extracts and also of phytoconstituents of interest, whenever desired.[2].

***Abutilon indicum* Linn.**

The Abutilon indicum Linn. belongs to family Malvacae found throughout hot parts of the India.

Classification [3,4]

Kingdom : Plantae
Class : Magnoliopsida
Order : malvales
Family : malvaceae
Genus : *Abutilon*
Species : *indicum*

Synonyms[5] : *Abutilon indicum* G. Don.

Vernacular name [6,7]

English : Indian mallow
Hindi : Kanghi
Bengali : Badela
Sanskrit : Kankatika, Rsyaprokta
Telgu : Tutturubenda
Tamil : Tutti,Thuthi

Figure 1. Overview of *Abutilon indicum Linn*

Traditional Uses

Almost all the parts are used traditionally for the treatment of various ailments. The roots of the plant are considered as demulcent, diuretic, in chest infection and urethritis. The infusion of the root is prescribed in fevers as a cooling medicine and is considered useful in strangury, haematuria and in leprosy. The leaves are found to be good for ulcer and as a fomentation to painful parts of the body. The decoction of the leaves is used in toothache, tender gums and internally for inflammation of bladder. The bark is used as febrifuge, anthelmintic, alexeteric, astringent and diuretic. The seeds are used in piles, laxative, expectorant, in chronic cystitis, gleet and gonorrhea.[8,9].Traditionally the plant is used in inflammation, piles, gonorrhea treatment and as an immune stimulant. Root and bark are used as aphrodisiac, anti diabetic, nervine tonic, and diuretic. Seeds are used as aphrodisiac and in urinary disorders.[10] Along with other therapeutic applications, *The Ayurvedic Pharmacopoeia of India* indicates the use of the root in gout, polyuria and haemorrhagic diseases.[11]

Plan of Work

1. Collection and Authentication of plant matrial
2. Extraction
   a) Extraction with water
   b) Extraction with solvent (ethanol)
3. Evaluation for Antifungal activity

2. Materials and methods

1. Collection and Authentication of Plant Material

For Root and Leaf of *Abutilon indicum* Linn.**(**family- Malvaceae**)**, plants were collected in the month of September from village Ismailpur Tha. Najibabad, Distt. Bijnor (U.P.) India. Plant was authenticated by Dr. Arvind Kumar, Department of R&D, Patanjali Ayurved Limited, D-38, Haridwar (U.K.) and obtained authentication no. is RUBL-20649.

2. Preparation of the extracts

Ethanol & Water Extracts were prepared with the help of Soxhlet apparatus.

Ethanol extract

The shade dried coarse powder of the leaves or roots were packed well in Soxhlet apparatus and were subjected for continuous hot extraction with 99.9% ethanol until the completion of the extraction. The extract was filtered while hot and the resultant extract was distilled in vacuum under reduced pressure in order to remove the solvent completely. Dried and kept in a desiccator till experimentation. Obtained extract was weighed and percentage yield was calculated in terms of air-dried powdered crude material.

Aqueous extract

The shade dried coarse powder of the leaves or roots were packed well in Soxhlet apparatus and was subjected for continuous hot extraction with distill water until the completion of the extraction. The extract was filtered while hot and the resultant extract was distilled in vacuum under reduced pressure in order to remove the solvent completely. Dried and kept in a desiccator till experimentation. Obtained extract was weighed and percentage yield was calculated in terms of air-dried powdered crude material.

$$\text{Percentage yield} = \frac{\text{Weight of Extract}}{\text{Weight of powder drug}} \times 100$$

3. Evaluation for Antifungal Activity [12-14]

Material required

Std. Drug-Griseofulvin **(**50µg/ml)

Alcoholic and aqueous extracts at different concentration were used for antifungal study. Well diffusion method was used for antifungal screening. The antifungal activity was expressed as zone of diameter in millimeters shown in table. Griseofulvin was used as standard drug. Used fungal stain names were as follow.

(a) *Microsporum gypseum* (MTCC4521)
(b) *Penicelliium chrysogenum* (MTCC160)
(c) *Aspergillus flavus* (MTCCM 277)
(d) *Fusarium sp.* (MTCC6083)

Preparation of medium

3.9g Potato-Dextrose Agar (Hi-Media) was added in 100 ml of distilled water along with different concentrations (100µg, 300µg and 500 µg) of alcoholic or aqueous plant extract (which were extracted by Soxhlet Method), and finally autoclaved at 15 lb/inch2 for 15 minutes. After autoclaving and cooling (about 45 0 C), it was poured into previously sterilized Petri plates. The pert plates were inoculated with the apical part of 7 days old experimental fungal mycelium. All Petri plates were kept into the incubator chamber at 28^0C.

Preparations of Controls

In controls, first the PDA medium without plant extract and inoculated with same fungus, in second, standard antifungal agent (griseofulvin) at the rate of 50µg/ml was added and inoculated with same fungal isolates, .

Antifungal activity

Antifungal activity was determined by comparing the experimental and control plates (i.e. Diameter of fungi in control plate - diameter of fungi in experimental plate). Zone of inhibition is also expressed by following formula.

$$\text{ZOI} = \frac{(\text{control}-\text{experimental})}{\text{Control}} \times 100$$

3. Results and Discussion

Yields of various solvents extracts

The Phytochemical screening of various extracts obtained by extraction using Soxhlet apparatus, the yields of various extracts were found as follows:

Table 1: Extraction values of *Abutilon indicum* root

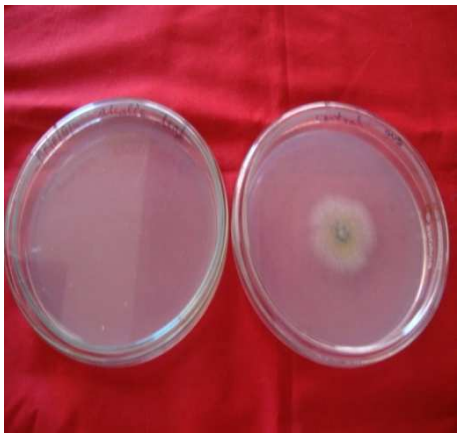
Extract	Yield (GM)	% W/W
Alcohol Soluble Extract	3.7	18.5
Water soluble Extract	4.12	20.5

Table 2: Extraction values of *Abutilon indicum* leaf

Extract	Yield (GM)	% W/W
Alcohol Soluble Extract	4.3	21.5
Water soluble Extract	4.8	24.0

Antifungal activity of Leaf Extract:
Micro-organism- *Microsporum gypseum***,** *Aspergillus flavus, Fusarium Sp*., *Penicelliium chrysogenum.*
Std. Drug - Griseofulvin

[A]-*Microsporum gypseum*



[B]-*Penicelliium chrysogenum*

[C]-*Aspergillus flavus*

[D]-Fusarium Sp

Figure 2: Antifungal activity of alcoholic leaf extract

A – Antifungal activity on ***Microsporum gypseum***
B - Antifungal activity on ***Penicelliium chrysogenum***
C - Antifungal activity on ***Aspergillus flavus***
D - Antifungal activity on ***Fusarium Sp.***

Table 3. Zone of Inhibition in millimeter

S.No	Fungi	Concentrations of alcoholic leaf extract			Concentrations of aqueous leaf extract			Griseo fulvin
		100 µg/ml (ZOI mm)	300 µg/ml (ZOI mm)	500 µg/ml (ZOI mm)	100 µg/ml (ZOI mm)	300 µg/ml (ZOI mm)	500 µg/ml (ZOI mm)	
1.	*Microsporum gypseum*	01	07	13	nil	nil	nil	28
2.	*Penicelliium chrysogenum*	02	08	12	nil	nil	nil	26
3.	*Aspergillus flavus*	nil	nil	nil	nil	nil	nil	31
4.	*Fusarium Sp.*	nil	nil	nil	nil	nil	nil	32

Antifungal activity of Root Extract

Table 4. Zone of Inhibition in millimeter

S.N.	Fungi	Concentrations of alcoholic Root extract			Concentrations of aqueous Root extract			Griseo fulvin
		100 µg/ml (ZOI mm)	300 µg/ml (ZOI mm)	500 µg/ml (ZOI mm)	100 µg/ml (ZOI mm)	300 µg/ml (ZOI mm)	500 µg/ml (ZOI mm)	
1.	*Microsporum gypseum*	nil	nil	nil	nil	nil	nil	29
2.	*Penicelliium chrysogenum*	nil	nil	nil	nil	nil	nil	28
3.	*Aspergillus flavus*	nil	nil	nil	nil	nil	nil	30
4.	*Fusarium Sp.*	nil	nil	nil	nil	nil	nil	32

From the result of antifungal activity it may be concluded that alcoholic leaf extract have positive & good response against *Microsporum gypseum& Penicelliium chrysogenum*. But the aqueous leaf extract has not shown the any antifungal activity and also aqueous & alcoholic root extract has not shown the any Antifungal activity.

4. Conclusion

In the present study, the root and leaf of *Abutilon indicum* was extracted by different solvents for finding various constituents present in the crude drug. The % yield alcohol & water extract of root was found to be 18.5% & 20.5% w/w respectively. The % yield alcohol & water extract of leaf was found to be 21.5%, 24.0% w/w respectively. From the experiment and results of antifungal activity it may be concluded that alcoholic leaf extract have positive & good response against *Microsporum gypseum& Penicelliium chrysogenum*. But the aqueous leaf extract has not shown the antifungal activity. In another case the aqueous & alcoholic root extract has not shown the Antifungal activity.

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