



“Formulation and Evaluation of Syrup Using Ethanolic Extract of Abutilon Indicum for Heavy Period”

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ABSTARCT

The plant Abutilon Indicum (Linn.) is belonging to malvaceae family; Also known as Indian Mallow in english, Abutilon indicum is used as a medicinal plant. It has been reported that Abutilon indicum has Dysuria gonorrhoea activity Anti inflammatory and Antiproliferative activity, Anti-Arthritic activity, Analgesic and Sedative property, Antioxidant and Antimicrobial activity, Hepatoprotective activity, Anti diabetic, Anti cancer, Anti diarrhoeal, Anticonvulsant, Larvicidal, Wound healing, Anti asthmatic, Diuretic, Immunomodulatory, and Anti-estrogenic activity. It is proved that this plant contains carbohydrates, proteins and aminio acids, saponins, flavanoids, glycosides, phytosterols and phenolic compounds.

Abutilon indicum, has been recognized in traditional medicine for its therapeutic effects, particularly in women's health. This summary discusses the potential role of Abutilon indicum syrup in managing menstrual health.

Keywords: Abutilon Indicum Dysuria Gonorrhoea Activity For Heavy Periods

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CHAPTER .1

AIM AND OBJECTIVE

CHAPTER : 1

AIM AND OBJECTIVE

Aim : This project aimed to perform dysuria gonorrhoea activity of Abutilon indicum . Formulation and evolution of syrup using ethanolic extract of Abutilon indicum for Heavy period

gonorrhea(Heavy menstrual bleeding)

5. Formulation of Abutilon indicum syrup

6. Evolution of formulation for different parameter

7. The objective of the study was to investigate the

Objectives:

1. Collection of plant of Abutilon indicum
2. Identification of plant of Abutilon indicum
3. Extension of all aerial part leaf of Abutilon indicum in ethanolic solvent using soxhlet apparatus
4. Abutilon indicum extract is must use for the Dysuria

cultivable bioequivalence associated

8. To determine the , safety & tolerability of oral progestogen therapy taken either during the uteal phase (short cycle) or for a longer course of 21 days per cycle (long cycle), in achieving are duration in menstrual blood loss in women of reproductive age with HMB

CHAPTER . 2

INTRODUCTION CHAPTER

.2

Introduction

Heavy menstrual bleeding is a common symptom amongst women of reproductive age .Heavy periods are an extremely common symptom, reported by 35% of women aged 25 to 44 . Heavy menstrual bleeding, also known as menorrhagia, is a common yet often overlooked health issue that affects a significant number of individuals of reproductive age. Concerns have been raised about the number of women who receive surgical intervention for heavy menstrual bleeding, often in the absence of demonstrable pathology . However, only

approximately 6% of women consult regarding menstrual problems annually . Heavy menstrual bleeding (HMB) is defined as excessive menstrual blood loss that affects a woman’s physical, emotional, social, and material quality of life . The prevalence of HMB among women of reproductive age ranges from 10% to 30% and is influenced by the approach to assessment and the clinical setting, as well as cultural, social, and age-driven perceptions of what constitutes ‘normal’ menstruation . Characterized by excessive menstrual blood loss that disrupts daily activities and can significantly impact quality of life, menorrhagia can be associated with various underlying causes, including hormonal imbalances, structural abnormalities in the uterus, and systemic health conditions. Despite its prevalence, many individuals suffer in silence, often due to lack of awareness, stigma, or inadequate healthcare resources.

Around 75% of women with HMB had actively sought information about heavy periods, mostly through internet research. The mean time from first symptoms until seeking help was 2.9 (Standard deviation, 3.1) years. However, 40% of women had not seen a health

care professional about the condition. Furthermore, 54% had never been diagnosed or treated. Only 20% had been diagnosed and received appropriate treatment. Treatment was successful in 69% of those patients currently receiving treatment. Oral contraceptives were the treatment most commonly prescribed for HMB, although the highly effective levonorgestrel-intrauterine system was used by only a small proportion of women .

Abutilon indicum (Indian abutilon, Indian mallow). It is also known as thuthi or atibala. It is a small shrub which belongs to malvaceae family. this plant mainly grown in tropical zones which may used for medicinal installation and also a decorative plant in olden days. its roots and leaves are used for treating ailments especially fever. its major role in protect our body health. The massive area of herbal plants is mostly covered beneficially in India the chief heritage system of medicines involves Ayurveda, siddha. The plant *Abutilon indicum* has been described that has anti-inflammatory, anti-proliferative activity anti-arthritic activity .



COMMON NAME :

Charaka Samhita :- Avaleha is available in various sthanas of Charak Samhita which are as follows:

- 1) **Sutra Sthana** - Snehavicharana
- 2) **Sharira Sthana** - Shishuprashan Vidhi
- 3) **Chikitsa Sthana** - Rasayana and Vyadhi Pratighata Chikitsa
- 4) **Kalpa Sthana** - 60 yogas are described
- 5) **Siddhi Sthana** - Utility of avaleha in Panchakarma

Sushruta Samhita [9]:

In Sushruta Samhita, Avaleha is mentioned in various Sthan as such as Sutra Sthana, Sharira Sthana, Chikitsa Sthana, Kalpa Sthana

VERNACULAR NAMES

Scientific Name-

indicum (L) Sweet ssp. *Indicum*; Urdu - Kangahi, Siyah, Kakahi, Baseband, Surkh Tamil- Thuthi English - Country mallow, Indian Mallow, Flowering Maples Telugu- Tuturi-chettu Hindi – Kangahi, kanghi Sanskrit- Atibala, Balika, Balya, Bhuribala, Ghanta, Shita, Vikantaka Assamese-Jayavandha, Jayapateri Bengali-Badela Kannada-Tribe, Mudragida, Shrimudrigida Kashmiri-Kath Malayalam- Tutti, Katuvan, Oorpam, Uram, Urubam Marathi-Mudra, petari Maharashtra-Peel booty, Karandi Punjabi-Kangi, Kangibooti Rajasthan-Jhili, Debi Folk-Kiangsi, Kakahiyaa Arabic- Mush



BOTANICAL DISTRIBUTION

Kingdom - Plantae-Plants

Sub kingdom-Tracheobionta-Vascular plants Super division-Spermatophyta-Seed plants Division-Magnoliophyta-Flowering plants Class-Magnoliopsida-Dicotyledons

Sub class-Dilleniidae Order-Malvales

Family-Malvaceae-Mallow family Genus-Abutilon Mill-Indian mallow

Species- Abutilon indicum (L.) Sweet-Monkeybushepilepsy, migraines, hypertension, liver disease, diabetes and malaria.^[2]

CHEMICAL CONSTITUENTS :-

This whole plant accommodates mucilaginous substances and asparagines. The leading compounds of Abutilon indicum are saponins, flavonoids, alkaloids, hexodes, n- alkane mixtures, alkenes. The other important constituent are beta sitosterol's, Para coumaric acid, caffeic acid, fumaric Acid, abutilon – A®-N-(1'-methoxy carbonyl-2'phenylethyl)4hydroxybenzamide, Para Hydroxybenzoic, gala tonic, para- beta-D-glycosyloxybenzoic and amino acids. The whole plant consists of crucial oils which mainly consists of alpha-pentene, caryophyllene oxide, Borneol, geraniol, geranylate, element and alpha-cineole along with number of other minor Constituents.

PHARMACOLOGICAL ACTIVITY

Anti-estrogenic activity

The anti-estrogenic effect of methanolic extracts of Abutilon indicum on uterotrophic and uterine peroxidase activities in ovariectomized rats was studied. This extract was found to cause significant suppression of enzyme activity as well as uterotrophic response induced by estradiol, whereas in the group, not treated with estradiol, a marginal stimulation in peroxidase activity was observed. These changes in peroxidase activity suggested that Abutilon indicum must be a highly potent estrogen antagonist with an extremely low degree of estrogenicity⁵⁰.

ANTI-DIARRHOEAL ACTIVITY

The methanolic extract and aqueous extract acquired

notable anti-diarrhoeal activity in castor Oil induced diarrhoea and prostaglandin E2 induced diarrhoea compared to the control group. Pharmacologic exploration relies in great part on the search for novel anti-fungal agents.

ANTI-MYCOTIC ACTIVITY

Methanolic extract of various parts of Abutilon indicum were tested for their ability to inhibit the aetiological agents of dermal fungal infections in humans. The anti-mycotic activity were screened by performing the test of minimum inhibitory concentrations and disc diffusion method.

ANTI-DIARRHOEAL ACTIVITY This plant is from Indonesia. Today, Rudraksha trees are found in tropical and subtropical regions up to 2000 meters above sea level. They are mostly found in Southeast Asia, Java Island, Sumatra, Borneo, Bali, Iran and Timor (Indonesia)

CHAPTER .3 LITERATURE AND REVIEW

CHAPTER . 3 LITERATURE AND REVIEW

1.2013 Abutilon indicum L (Malvaceae)-Medicinal Potential Review The plant Abutilon Indicum (Linn.) is belonging to malvaceae family; Also known as Mallow in english, Abutilon indicum is used as a medicinal plant. It has been reported that Abutilon indicum has Anti inflammatory and Anti-proliferative activity, Anti-Arthritic activity .

2.2013 PHARMACOGNOSTIC INVESTIGATION ON ROOTS & LEAVES EXTRACT

OF ABUTILON INDICUM LINN. Shilpi Arora, Devendra Pratap Singh *, Ankit Saini, Ashish Kumar Herbal medicines are natural products and their phytoconstituents vary depending on time and region, processing and storage. Variations in the collection, processing or storage of an herb could impact its efficacy profile. Since prior knowledge regarding appropriate collection and usage of most medicinal plants exists in tradition, it can be used as a guide to quality standardization. The present study is aimed to carry out research work to evaluate Pharmacognostic investigation on Root & Leaf extract of Abutilon indicum. From the literature study it is found that a very little work is done on root & leaf part of plant for setting

standardization limits. So, our aim is to find out again various standardization limits according WHO guideline like macroscopic & microscopic study, to find out LOD, ash values, extractive values etc.

3.2018 ABUTILON INDICUM– AN EXCELLENT PHYTOMEDICINE: A REVIEW R.

Nithyatharani¹, U.S. Kavitha Assistant Professor, PG Student Department of Microbiology Cauvery College for Women, Trichy, India- 620 018 Medicinal plants are a boon to human beings to lead a disease free healthy life. They play a major role in maintaining human health. One such medicinal plant is Abutilon indicum. It is an erect, woody, shrubby plant and widely distributed in the tropical countries. The whole plant is used to cure many diseases. It is a rare weed plant mostly found in wastelands of tropical region. The whole plant of Abutilon indicum has a good deal of various components. The leaves include steroids, saponin, carbohydrates and flavonoids. The root comprises linoleic acid, oleic acid, stearic acid, palmitic acid whereas the seeds embrace all the essential aminoacids with palmitic acid.

4.2016 A Review on Pharmacological Activities of Abutilon indicum (Atibala)Mr. T. Shekshavali^{1*}, Dr. S. Roshan Research Scholar, Mewar University, Rajasthan. 2Research Supervisor, Mewar University, Rajasthan, India.

5.2015 SUPPLEMENTATION OF ETHANOLIC EXTRACT OF ABUTILON INDICUM (L) SWEET PREVENTS UROLITHIASIS IN EXPERIMENTAL RATS Chitikela P

Pullaiah^{1*}, Narasimha Kumar. GV¹, Vineela Ruth Madhuri P², Dhanunjaya S¹, Pushpa Kumari B¹, Ranganayakulu.D The present study was designed to evaluate the anti-urolithiatic activity of Abutilon indicum (L) extract in ethylene glycol (EG) and Vit. D₃ induced urolithiasis in rats. The protective effective of Abutilon indicum (L) extract was studied in dose dependent manner by using 200mg/kg and 400mg/kg against ethylene glycol (EG) and Vit. D₃ induced urolithiasis in rats for 28 days

6.2013 ABUTILONS INDICUM LINN: A PHYTOPHARMACOLOGICAL REVIEW

Vadnere Gautam, Pathan Aslam, Kulkarni Bharti and Abhay Kumar Singhai Medicinal plants are being widely used, either as a single drug or in combination in health care delivery system. Medicinal plants can be important source of previously unknown chemical substances with potential therapeutic effects. Abutilon indicum (Linn) (Malvaceae) is a shrub distributed throughout India. The various parts of the plant (leaves, roots, seeds and seed oil) are widely used by various tribal communities and forest dwellers for the treatment of variety of ailments.

7.2013 Therapeutic significance of abutilon indicum:

An overview Milind Kashinath Patel, Ambarsing Pratapsingh Rajput ,P. S. G. V. P. Mandal's SIP Arts, GBP Science and STSKVS Commerce College, Shahada, Dist : Nandurbar (M.S.) India – 425409 Z.B.Patil College, Deopur, Dhule (M.S.) India.Abutilon indicum is known as “Atibala” in Sanskrit. Literally “Ati” means very and “Bala” means powerful, referring to the properties of this plant as very powerful. Abutilon indicum is a hairy herb or under shrub distributed

throughout the tropical

CHAPTER .4 MATERIAL AND METHODES

CHAPTER .4 METHODE ANDPREPARATION

A. Pharmacognostic Evalution

1. Collection Of Fresh leaves Abutilon Indicum :-

The leaves were collected from the reserved forest areas of Maharashtra in the months of July/ August and were identified by Dr.Miss . Rupali.M.Patil , Smt.S.S.Patil Collage Of Pharmacy Chopda .The leaves were shade dried and powered.

2. Drying of Plant material :-

Leaf parts were separated from the Abutilon indicum Plant then washed with water. Kept in sun light for thirty minutes and then dried under shade at room temperature for 15 days. Grounded to a coarse powder and passed through a 60 # sieve for Uniform particle size.

3. Macroscopic study :-

Macroscopic characteristics of Root of Abutilon indicum Shape - oval

Surface characteristic - Surface was Rough Colour – Light Green

Odour – Characteristic & persistent Taste – Slightly Sweet

4. Microscopical study :

T.S. of the Leaf The pieces of leaves were boiled in a test tube with chloral hydrate for several minutes until complete removal of chlorophyll. The leaf can be examined from both the dorsal and ventral surfaces. Transverse section was obtained by cutting the leaf portion including mid rib with the help of sharp blade and staining was done by safranin to impart a red color to the lignified tissue.

Table 2: Quantitative Microscopy

Sr.No.	Leaf Constant	Mean value
1	Stomatal Index	5.4±0.5
2	Upper Surface	4.9±0.4
3	Lower Surface	15.9±0.5
4	Palisade Ratio	5±1
5	Vein Islet Number	12±1
6	Vein Termination Number	15±2

Microscopic study of Leaf powder :-

Microscopic study of root & leaf powder is used to find out the characteristics (like presence of calcium oxalate crystals, starch grains, lignified cell walls,powdered

Powder Microscope :

odourlessand taste:

sweet to characteristic in nature. The dried and pulverized fine powder was pigmented with chloral hydrate which is used to detect the presence of calcium oxalate crystals. They were prismatic in nature. When stained with phloroglucinol and conc. Hcl, the Vascular bundle.

Procedure :- The following reagents were used for Microscopic study of leaf powder.

1. Iodine solution

2. FeCl₃ Solution

Table 2: Characteristics of Powder microscopy of *Abutilon indicum* Leaf

S. N.	Reagents	Observation	Inference
1.	Iodine solution	Blue colour	Starch present grains
2.	FeCl ₃ Solution	Blue black colour	Tannins present were
3.	Lectochloral	Observed calcium oxalate crystals	Calcium oxalate crystals Present

1. Iodine solution: It was prepared by dissolving 2.6g Iodine & 3g KI in 100 ml of water (q.s). With iodine solution starch turns blue. So presence of starch in root & leaf powder was detected with iodine solution lignified fibres were clearly observed.

2. FeCl₃ Solution – FeCl₃ Solution was prepared by dissolving 5g of FeCl₃ in 100 ml of 90% alcohol. This solution is also known as 5% FeCl₃ Solution. With FeCl₃ Solution tannins give blue black color. So presence of tannins in the leaf powder was detected with FeCl₃ Solution.

B .Physicochemical Investigation :-

Loss on drying Loss on drying is the loss of mass expressed as per cent w/w. Loss on drying determines both water and volatile matter in the crude drug. Moisture is an inevitable component of crude drug, which must be eliminated as far as possible. An accurately weighed quantity of about 2 g of powdered drug was taken in a tared glass petridish. The powder was distributed evenly. The petridish kept open in vacuum oven and the sample was dried at a temperature between 100 to 105°C for 2 h until a constant weight was recorded. Then it was cooled in a desiccator to room temperature, weighed and recorded. % Loss on drying was calculated using the.

Determination of Ash values :-

Ash values are helpful in determining the quality and purity of a crude drug, especially in the powdered form. The objective of ashing vegetable drugs is to remove all traces of organic matter, which may otherwise interfere in an analytical determination.

following formula % Loss on drying = $\frac{\text{Loss in weight of the sample}}{\text{Weight of the sample}} \times 100$

a) Total Ash value:

It is the total amount of material remaining after ignition. This includes both “Physiological ash”, which derived from the plant tissue itself, and “Non physiological ash”, which is residue of the extraneous matter. Total ash value was found out after putting the drug (about 2 gm) in crucible by using furnace at temp. of 600°C for 2hr. Now calculated the percentage yield of ash value with reference to air dried drug.

b) Acid-Insoluble Ash:

It is residue obtained after boiling the total ash with dilute hydrochloric acid, and igniting the remaining insoluble matter. Boiled the ash for 5 to 10 minutes with 25ml of dilute hydrochloric acid, collected the insoluble matter in a crucible on an ash less filter –paper, ignited, and weighed. Now calculated the percentage yield of acid-insoluble ash with reference to the air-dried drug.
% Acid insoluble ash value = $\frac{\text{Wt. of acid insoluble ash}}{\text{Wt. of crude drug taken}} \times 100$

c) Water soluble Ash value:

Boiled the total ash for five minutes with 25 ml of water; collected the soluble matter in a crucible, ignited, and weighed. Calculated the percentage or water soluble ash with reference to air dried drug. Physicochemical Evaluation for Leaves In the present study, Leaf powder was investigated for the physicochemical characterization according WHO guideline and following results were found of loss on drying, ash values & extractive values.

In the present study, Leaf powder was investigated for the physicochemical characterization according WHO guideline and following results were found of loss on drying, ash values & extractive values.

Table 4: Physicochemical Parameters of *Abutilon indicum* Leaves

S.N	Physical Constants	Results
1	Loss on drying	6.67%
2	Total ash value	7.4%
3	Acid-insoluble ash value	1.0%
4	Water soluble ash value	4.30%
5	Alcohol soluble extractive value	3.97%
6	Water soluble extractive value	9.36%

Leaves:

The leaves of the plant contain steroids, sapogenins, carbohydrates and flavonoids²⁰. Eudesmic acid, ferulic acid and caffeic acid have been isolated from the methanol extract of leaves of the plant *Abutilon indicum*. IR, ¹H-NMR, ¹³C-NMR, mass spectroscopy and chemical methods allowed the identification of these compounds.²¹ Flavonoids, Terpenes, Amino acids, Aldehyde, Hydrocarbon, Ketone, Fatty acids and esters were reported for the first time from the ethanolic leaf extract of *Abutilon indicum* by using gas chromatography coupled to mass spectrometry (GC-MS)²²

Preliminary phytochemical screening revealed that aqueous and ethanolic extracts are a rich source of carbohydrates, proteins, phenols, flavonoids, and saponins. Steroids are present

only in ethanolic extract. Phenols are more in aqueous extract than alcoholic extract.

Saponins are rich in alcoholic extract than aqueous extract.

High-performance thin layer chromatography (HPTLC):

procedure :-

Luteolin standard solution preparation: To create a luteolin standard solution, 10 mg of luteolin was dissolved in 10 ml of methanol, resulting in a concentration of 1000 µg/ml. From this solution, 1 ml was further diluted with methanol to yield a 100 µg/ml solution. Subsequently, 10 µl of this diluted solution was carefully applied to a thin layer chromatography (TLC) plate.

Table 2

Preliminary phytochemical analysis of *Abutilon indicum* fruit

Test applied	Test for	AIFAE	AIFEE
Molisch test	Carbohydrates	+++	+++
Fehling's test		++	—
Benedict's test		—	—
Biuret test	Proteins	+++	+
Millon's test		+++	+++
Dragendorff's test	Alkaloids	—	—
Wagner's test		—	—
Hager's test		—	—
Mayer's test		—	—
Borntager's test	Glycosides	—	—
Ferric chloride test	Phenols and Tannins	+	+
Lead acetate test		+++	+
Dilute Kmno ⁴ test		+++	+++
Shinoda test	Flavonoids	+	+
Alkaline reagent test		++	++
Foam test	Saponins	+	+++
Salkowski test	Steroids	—	++
Liebermann's test		—	++

[Open in a separate window](#)

(+): Present in minor quantity; (++): Present in moderate quantity; (+++): Present in high quantity; (—): Absent, AIFAE: *Abutilon indicum* fruit aqueous extract, AIFEE: *Abutilon indicum* fruit ethanolic extract

Sample preparation:

The sample under investigation was dissolved in methanol. Procedure: The following steps were followed for the chromatographic analysis Standard and sample solutions (10 µl each) were applied to the TLC plate as bands with a width of 6 mm and a 5 mm gap between bands. This application was done using a 100-µl sample syringe from Hamilton (Bonaduz, Switzerland). A pre-coated silica gel aluminum plate 60 F254 (5 cm × 10 cm) with a thickness of 250 µm (from E. MERCK, Darmstadt, Germany) was used as the stationary phase. The slit dimensions were set at 5 mm × 0.45 mm, and the scanning speed was maintained at 20 mm/sec. Chromatography was conducted in a twin-

trough glass chamber (10 cm × 10 cm) using a mobile phase consisting of n-Hexane and ethyl acetate in a 5:5 v/v ratio. The mobile phase was allowed to saturate the chamber for 15 minutes to ensure optimal conditions. The chromatogram run length was 8 cm, and the development time took approximately 15 minutes. Following the chromatographic separation, the TLC plates were dried using a hair dryer. Densitometric scanning was performed at a wavelength of 400 nm using a CAMAG thin-layer chromatography scanner. The scanner was operated with WINCATS software version 1.4.2. This comprehensive procedure enabled the separation and quantification of luteolin in both the standard and sample solutions using HPTLC .

Table 4

R_f values of different extracts at 254 nm

Sample	Volume applied on TLC plate (v/v) (µL)	Detection wave length (nm)	Number of peaks and R ^f value
Alcoholic extract	15	254	9 and 0.02, 0.08, 0.15, 0.23, 0.32, 0.52, 0.55, 0.74, 0.86
Hydroalcoholic extract	10	254	10 and 0.02, 0.09, 0.12, 0.45, 0.52, 0.55, 0.72, 0.75, 0.83, 0.88
Hydroalcoholic extract	15	254	12 and 0.02, 0.10, 0.16, 0.30, 0.35, 0.46, 0.54, 0.57, 0.74, 0.76, 0.84, 0.87

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TLC: Thin-layer chromatography

The qualitative phytochemical analysis of the ethanolic leaves extract of Abutilon indicum (ELEAI) :-

"+" Symbol: This symbol typically denotes a positive test result, indicating the presence of the particular phytochemical in the ethanolic leaves extract of abutilon indicum (ELEAI) for the corresponding test.

"—" Symbol: This symbol typically denotes a negative test result, indicating the absence of the particular phytochemical in the ELEAI for the corresponding test.

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

Standardization Parameters	% W/W (Mean $\pm$ SEM)
Total Ash	4.52 $\pm$ 0.12
Acid Insoluble Ash	2.54 $\pm$ 1.21
Water Soluble Ash	2.01 $\pm$ 0.09
Sulphated Ash	3.42 $\pm$ 0.02
Alcohol Soluble Extractive Value	6.32 $\pm$ 0.23
Water Soluble Extractive Value	4.32 $\pm$ 1.24
Loss on Drying	6.34 $\pm$ 0.54

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

S. No.	Particulars	Values
1.	Stomatal Number	Upper Epidermis 3.12
		Lower Epidermis 5.23
2.	Stomatal Index	Upper Epidermis 13.12
		Lower Epidermis 20.21
3.	Vein islet Number	2.0 - 4.56
4.	Vein Termination Number	3.23 - 5.67

Table 4: Fluorescence Analysis of the leaf extract of *Abutilon indicum*

S. No.	Sample	Colour in day Light	Colour in Short UV 365 nm	Colour in Long UV 480 nm
1.	Petroleum Ether Extract	Light Green	Dark Green	Emerald Green
2.	Ethyl Acetate Extract	Dark Green	Scarlet Red	Light Green
3.	Chloroform Extract	Dark Green	Dark Greenish Brown	Emerald Green
4.	Methanolic Extract	Green	Scarlet Red	Dark Green
5.	Aqueous Extract	Brown	Pale Yellow	Light Yellow

Table 5: Extractive Values of Leaf extracts of *Abutilon indicum* with Different solvents

S. No.	Extracts	% Extractability (Mean $\pm$ SEM)
1.	Petroleum Ether Extract	4.62 $\pm$ 0.89
2.	Ethyl Acetate Extract	6.45 $\pm$ 1.23
3.	Chloroform Extract	9.65 $\pm$ 2.20
4.	Methanolic Extract	20.34 $\pm$ 1.09
5.	Aqueous Extract	12.32 $\pm$ 2.89

C) Extraction: Preparation of the Ethanolic Extract :



Fig. 3: Extraction Procedure by Soxhlet

Abutilon indicum leaves were washed with sterilized distilled water, dried, and ground into a fine powder. This powder was subjected to extraction using a 70:30 ethanol-water mixture in a Soxhlet extractor for three days, maintaining a temperature of 60°C. The liquid extract was then concentrated by removing the solvent on a rotary evaporator, ensuring the temperature did not exceed 50°C. This resulted in a light brown solid extract, which was reconstituted in sterile distilled water and stored in a cool, dark place until further experiments. Male Wistar albino rats, weighing between 150 and 200 g, were employed for this study. These animals were kept in sanitary polypropylene cages with a consistent laboratory environment - a temperature of about 2°C and a 12-hour light-dark cycle. The rats had unrestricted access to standard feed and water.

D) Standardizing Abutilon indicum syrup, consider the following parameters:

1. **Active Ingredient Content:**

Determine the concentration of key bioactive compounds present in Abutilon indicum, such as flavonoids, alkaloids, and polysaccharides, using appropriate analytical methods like high- performance liquid chromatography (HPLC) or spectrophotometry.

2. **Marker Compounds:**

Identify specific chemical markers or compounds characteristic of Abutilon indicum, which can be used for quality control and standardization purposes.

3. **Total Solids Content:**

Measure the total solids content of the syrup to ensure consistency and potency, typically expressed as a percentage of dry weight.

4. **Ash Content:**

Determine the ash content as an indicator of the purity and mineral composition of the syrup, ensuring it falls within acceptable limits.

5. **Heavy Metal Analysis:**

Conduct tests for heavy metal contamination, including lead, cadmium, arsenic, and mercury, to ensure the safety of the syrup for consumption.

6. **Microbial Contamination:**

Perform microbial testing to assess the presence of bacteria, yeast, and molds, ensuring the syrup meets microbiological safety standards.

7. **Pesticide Residue Analysis:**

Screen for pesticide residues to ensure compliance with regulatory limits and minimize potential health risks associated with pesticide exposure.

8. **Physical Characteristics:**

Evaluate physical parameters such as viscosity, pH, density, and color to ensure consistency and uniformity of the syrup.

9. **Stability Studies:**

Conduct stability testing under various storage conditions to determine shelf life and ensure the syrup maintains its potency and efficacy over time.

10. **Regulatory Compliance:**

Ensure compliance with relevant regulatory standards and guidelines for herbal products, including labeling requirements, manufacturing practices, and safety standards. By standardizing Abutilon indicum syrup based on these parameters, you can ensure its quality, efficacy, and safety for therapeutic use.

E) Formulation of abutilon indicum Syrup :

Creating a syrup formulation from Abutilon indicum typically involves extracting its active ingredients and combining them with a suitable syrup base. Here's a basic recipe:

Ingredients :-

1. Abutilon indicum extract (prepared by boiling Abutilon indicum leaves in water and straining)
2. Sugar or honey (as a sweetener)
3. Water

1. Sugar

Sucrose and non-sucrose based syrup Functions of sucrose or its derivatives:

- i. Viscosity ii. Sweetness iii. Flavoring agent iv. Masking bitter taste. Sucrose Dextrose Non-sugars Sorbitol Glycerin

2. Antimicrobial preservatives:

The amount of a preservative required to protect a syrup against microbial growth varies with the proportion of water available for microbial growth and capability of preservative itself.

Most commonly used preservative:

Composition :

1. Benzoic acid (0.1 to 0.2%)
2. Sodium benzoate (0.1 to 0.2%)
3. Methyl-, propyl-, and butylparabens (0.1%) Alcohol (15 to 20%) [if alcohol soluble components are present in syrup]

3. . Flavorants:

Most syrups are flavored with:-

1. Naturally occurring materials: Volatile oils i.e. Orange oil.
 2. Synthetic flavorants: Vanillin and others.
- Purpose: To render the syrup pleasant taste.

4. Colorants

Syrups are frequently prepared by one of four general methods.

- 1) solution of the ingredients with the aid of heat,
- 2) solution of the ingredients by agitation without the use of heat, or the simple admixture of liquid

components,

3) addition of sucrose to a prepared medicated liquid or to a flavored liquid,

4) percolation of either the source of the medicating substance or of the sucrose.

Sometimes a syrup is prepared by more than one of these methods.

► Most syrups contain a high proportion of sucrose, usually 60% to 80% not only because of desirable sweetness and viscosity of such solutions but also because of their inherent stability in contrast to the unstable character of dilute sucrose solutions.

► Aqueous sugar medium dilute sucrose has efficient nutrient medium for growth of microorganisms.

► While concentrated sugar solutions are quite resistant to microbial growth because of unavailability of water required for growth of microorganisms.

► So, concentrated sugar solutions generally do not require additional preservatives if it is to be used soon; preservatives are added if syrup is to be stored.

Instructions :-

1. Prepare the Abutilon indicum extract by Boiling the leaves or roots in water for about 30 minutes. Let it cool and strain to remove solid particles.
2. Measure the desired amount of Abutilon indicum extract.
3. In a separate pot, combine water and sugar or honey to create a syrup base. The ratio of water to sweetener can vary depending on your preference for sweetness.
4. Heat the mixture over low heat, stirring continuously until the sugar or honey completely dissolves.
5. Once the syrup base is ready, gradually add the Abutilon indicum extract while stirring constantly.
6. Continue heating and stirring until the mixture reaches the desired syrup consistency.
7. Let the syrup cool completely before transferring it to a clean, sterilized bottle or jar.
8. Store the Abutilon indicum syrup in the refrigerator and use it as needed. It's important to note that while Abutilon indicum has been used in traditional medicine, its safety and efficacy may vary, and it's always advisable to consult with a healthcare professional before using any herbal remedy.

TEST	ETHANOLIC EXTRACT
Alkaloids	+
Aminoacid	+
Flavonoids	+
Phenols	-
Streoids	+
Glycosides	+
Saponins	-

F) Evaluation parameters of abutilon indicum

When evaluating Abutilon indicum syrup, several parameters can be considered to assess its quality, efficacy, and safety. Here are some key evaluation parameters:

1. **Chemical Composition:**

Analyze the phytochemical constituents of the syrup to determine the presence and concentration of bioactive compounds such as flavonoids, alkaloids, phenols, and polysaccharides.

2. **Biological Activity:**

Conduct in vitro and in vivo studies to evaluate the pharmacological effects of the syrup, including anti-inflammatory, antioxidant, antimicrobial, antitussive, and immunomodulatory activities.

3. **Clinical Efficacy:**

Perform clinical trials to assess the therapeutic efficacy of Abutilon indicum syrup in treating specific health conditions such as respiratory infections, cough, sore throat, and digestive disorders.

4. **Safety Profile:**

Investigate the acute and chronic toxicity of the syrup through preclinical studies and monitor adverse reactions in clinical trials. Assess potential risks, contraindications, drug interactions, and long-term safety.

5. **Quality Control:**

Implement quality control measures to ensure the consistency, purity, and stability of the syrup formulation. This includes testing for microbial contamination, heavy metals, pesticides, and other contaminants.

6. **Dosage and Administration:**

Determine the optimal dosage regimen for different age groups and administration methods to ensure optimal therapeutic effects.

7. **Taste and Palatability:**

Consider the taste and palatability of the syrup, as this can influence patient compliance, especially for children or individuals with specific taste preferences.

8. **Quality Control:**

Assess the manufacturing process, including quality control measures to ensure consistency, purity, and potency of the syrup.

9. **Clinical Studies:**

Review any clinical studies or trials conducted to demonstrate the efficacy and safety of the syrup in treating specific conditions.

10. **Regulatory Compliance:**

Ensure that the syrup complies with regulatory standards and guidelines for herbal products, including labeling requirements and manufacturing practices. By evaluating these aspects, you can determine the overall quality, efficacy, and safety of Abutilon indicum syrup for therapeutic use.

CHAPTER .5 RESULT AND DISCUSSION

CHAPTER .5

RESULT AND DISCUSSION

The phytochemical analysis and analysis of Abutilon indicum was Phytochemicals are non- nutritive plant chemicals that have protective or disease preventive properties. Plant produces these chemicals to protect

itself but recent research demonstrates that many phytochemicals can protect humans against various diseases. The phytochemical analysis showed the presence of Alkaloids, Amino acids, Flavonoids, Glycosides, steroids and Saponins. The study plant has been reported as cure for many diseases and the reason for the medicinal property may be because of the presence of these phytochemicals. It is well documented that the presence of these chemicals is responsible for various medicinal properties and reported time to time by various researchers. There are many reports available to support the role of phytochemical constituents and their activity against specific disease showed a remarkable activity against the Abutilon indicum dysuria gonorrhea activity for heavy periods. He maximum activity compared to the control shows the potential of the plant and is an indicator for determining the significance of the activity against the pathogens. The relevance with which increased activity along the increase in concentration may be noted against all the pathogens and a detailed study is required to conclude the exact reason for this.

This review provides valuable information about the various phytoconstituents and biological activities of genus Abutilon for the first time. It is reported that Abutilon plants contain different classes of chemical constituents including flavonoids, alkaloids, fatty acids, steroids, triterpenes, coumarins and iridoid glycosides together with a several medicinal benefits such as such as antioxidant, anti-inflammatory, antipyretic, hepatoprotective, analgesic and anti-hyperglycemic. According to the present review, genus abutilon is considered a good point of interest and some species such as A. pannosum , A. mauritanum, A. crispum, A. grandiflorum, A. bidentatum, A. figarianum A. ochsenii and A. vitifolium need further studies to explain the mechanisms of action of its biological actions that assists to develop and explore new drugs from natural source.

The present study established the qualitative and quantitative diagnostic features of A. indicum fruits through morphological, powder microscopical, physicochemical, and HPTLC analysis. Phytochemical analysis revealed that alcoholic and aqueous extracts are rich sources of saponins, phenols, flavonoids, carbohydrates, and proteins. HPTLC chromatograms of the alcoholic extract have shown nine peaks and hydroalcoholic extract has shown twelve peaks, which helps as a fingerprint for identification and standardization. This powder microscopical and phytochemical study results will help in minimizing adulteration, authentication of the original crude drug and in carrying out further research on A. indicum fruits. The extensive survey of literature revealed that A. indicum is an important plant of Ayurveda. It is being used since a long time in making ayurvedic drugs. Medicinally saponins possess hypoglycemic and antifungal activities. Linoleic, oleic, palmitic, lauric, stearic, and other fatty acids found in the plant claims analgesic activities. β -sitosterol is reported to possess antipyretic actions and flavonoids having hypoglycemic activities. Besides, the gum and resin obtained from the plant are used in rheumatism and show anti

plasmolatory reaction, which support the use of this plant for the various purposes since ancient times. Thus, the phytochemicals found therein possess various applications in the allopathic treatment for better drug rationale therapy .

RESULT .

CHAPTER .6 SUMMARY AND CONCLUSION

CHAPTER .6

SUMMARY AND CONCLUSION

Abutilon indicum Linn, is an important medicinal plant with diverse pharmacological spectrum. Lot of pharmacological studies have been carried out with extract of the different parts of the plant. The plant is widely used in traditional medicinal system of India and has been reported to possess Dysuria gonorrhoea activity Anti inflammatory and Antiproliferative activity, Anti- Arthritic activity, Analgesic and Sedative property, Antioxidant and Antimicrobial activity, Hepatoprotective activity, Anti diabetic, Anti cancer, Anti diarrhoeal, Anti-convulsant, Larvicidal, Wound healing, Anti asthmatic, Diuretic, Immunomodulatory, and Anti- estrogenic activity. In the present study, Leaf of Abutilon indicum was subjected to Pharmacognostic study. In pharmacognostic study, various standardization parameters like macroscopic & microscopic study, loss on drying, ash values, extractive values etc. were determined on the Leaf of Abutilon indicum. The water soluble extractive value of the crude drug was found to be than alcohol soluble extractive value.

CONCLUSION

Abutilon indicum have many more pharmacological properties like, gonorrhea, hepatoprotective, wound healing, immunomodulatory, analgesic, antimalarial, antimicrobial, hypoglycemic activity. The main chemical constituents are carbohydrates, steroids, glycosides, flavonoids, tannins and Phenolic compounds. Hence this review article, effort has been taken to collect and compile the details notes on Abutilon indicum which will be useful to the society to venture into a field of alternative systems of medicine. The present review summarizes some important pharmacological studies on Abutilon indicum and phytochemical investigations and isolated principles from them, which can be investigated further to achieve lead molecules in the search of novel herbal drugs. Due to medicinal properties there is enormous scope for future research on Abutilon indicum and further clinical and pharmacological investigation should be conducted to investigate unexploited potential of this plant The present review summarizes some important pharmacological studies on Abutilon indicum and phytochemical investigations and isolated principles from them, which can be investigated further to achieve lead molecules in the search of novel herbal drugs. Due to medicinal properties there is enormous scope for future research on Abutilon indicum and further clinical and pharmacological investigation should be conducted to investigate unexploited potential of this plant .

CHAPTER .7 REFERENCES

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