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Review Article

Review On Abutilion Indicum (Mudra)

Lahoo Balu Palave[1]*, Mahendra S. Shendkar [1], Leena Parkhi[1] , Lalit Ambhore[1] , Manish Bhosle[1], Snehal D. Kothavale[3], K. V. Otari[2]

[1]Navsahyadri Institute Of Pharmacy, Nasrapur Pune.
[2]Principal, Navsahyadri Institute Of Pharmacy, Nasrapur Pune.
[3]Professor of Navsahyadri Institute of Pharmacy Nasrapur, Pune

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ABSTRACT

In Sanskrit, Abutilon indicum is referred to as "Atibala." "Ati" literally means "very," and "Bala" means "powerful," alluding to the plant's exceptionally potent qualities. Leaf is used to make medicine. Across the tropics, abutilon indicum is a hairy plant or under shrub. Different plant components, including roots, leaves, flowers, bark, seeds, and stems, have been employed as antioxidant, laxative, diuretic, analgesic, anti-inflammatory, and anti-ulcer medicines in traditional medical systems. Secondary metabolites with intriguing biological activities can be found in abundance in plants. These secondary metabolites have a diversity of structural configurations and characteristics, making them an important source overall. It either actively participates in the interest in bioactive secondary metabolites of plant amelioration or has a positive impact on health. Recent scientific advancements have looked into the medicinal qualities of plants. Because of their potential antioxidant efficacy, lack of adverse effects, and economic viability, they are used all over the world.

INTRODUCTION

About 150 annual or perennial herbs, shrubs, or even small trees belong to the Abutilon genus of the Malvaceae family, which is extensively spread throughout the tropical and subtropical regions of America, Africa, Asia, and Australia1. It may grow in poor and dry soils; all it requires is heat and sunlight. In India, it is rather common to find it growing on roadside waste spots and abandoned buildings. It normally flowers in the winter after the rains. It is also grown for ornamental purposes in Poland. Many Abutilon species plants have long been prized for their diverse pharmacological and medicinal properties.There has recently been a resurgence of scientific interest in studying the species, and several of the plants that belong to it are highly prized Ayurvedic remedies. Ethnobotanical investigations carried out by researchers and traditional medical systems like Ayurveda have shown that the many parts of the

***Corresponding Author:** Lahoo Balu Palave
Address: *Navsahyadri Institute Of Pharmacy, Nasrapur Pune..*
Email : lahoopalave@gmail.com

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plant Abutilon, including its roots, leaves, and seeds, have a variety of medicinal characteristics. Since then, a wide range of compounds, the majority of which are flavonoids, steroids, terpenoids, and phenolics, have been identified from the genus Abutilon. Several Abutilon species are also used to extract valuable fibers. The plant fibers such as A. indicum, A. polyandrum, and A.asiaticum are employed in the production of cordages, ropes, medicines, rugs, wrapping paper, tissue papers, rubber, tires, textiles, shoe polishes, and coarse cloth. Chinese jute is a valuable material that is produced by Abutilon avicennae.

Morphology Of Abutilion Indicum:

Abutilon indicum (L.) Sweet, sometimes referred to as "Country Mallow" in English, "Kanghi" in Hindi, and "Atibala" in Sanskrit, is a plant that grows throughout northern and central India and the outer Himalayan regions from Jammu to Bhutan up to a height of 1500 m. It is widely distributed in wastelands and grows as a weed. It is a gently tomentose plant that is herbaceous or shrubby. The stem is rounded and frequently has a purple hue. The cylindrical root has a diameter of 1.2 to 1.5 cm, a smooth surface, a golden hue, and a salty flavor and aroma. The yellow stem has a diameter of 0.3 to 0.9 cm. Evergreen, stipulate, and cordate leaves are present. The bark is smooth on the inside and has a hairy, yellow outside that has been flattened. Fibrous fractures are seen. The blooms are bisexual, pedicillate, and yellow in color. The petiole is cylindrical with stellate hair, 1.5–7.0 cm length, and yellowish brown in color. The lamina is hairy above and glaucous below, and it is crenate, reticulate, acute to acuminate, minutely stellate, dentate, and dull green in color.

Vernacular Names :-

Sanskrit	Atibala, Kantika
Hindu.	Atibala, Tara kanchi, Itawari, Jhili, Debi, Kanghi, Tara-kanchi
English	Country mallow
Kannada -	Gidutingi, Hetakisa, Hettukisu, Hettutti, Hetutti, Kisangi, Shrimudri
Malayalam	Belocre, Katturam, Katturan, Katuram, Pettekaputti, Pitikkapattu.
Tamil	Ottuttutti, Tutti, Perundhuthi, Tutti-p-pattai, Kakkati, Kikkaci, Tuttikkirai.
Telgu	Adavibenda, Adivibenda, Botlabenda, Dudi, Muttavaciribenda.
Marathi-	Akakai, Kansuli, Karandi, Madmi, Mudra, Mudrika, Petaari, Pidari.

Scientific classification :-

Kingdom Plantae.	Plants
Class Magnoliopsida	Dicotyledons
Family	Mallow family
Genus Abutilon Mill	Indian mallow
Species Abutilon indicum (L.)	Monkeybush

Biological Source :-

Known by the common names Thuthi and Atibala, Abutilon indicum is a medicinal plant that is a member of the Malvaceae family. It is a woody, shrubby, upright plant that grows widely in tropical regions. Abutilon Indicum (Linn.) is the geographical source. Malvaceae, the sweet family, is also known as "Country mallow" in English, "Kanghi" in Hindi, and "Atibala" in Sanskrit. Growing up to 3 meters tall, this perennial shrub has a smooth tomentose texture. The plant can be found in Malesia, Sri Lanka, India, and some parts of America.

Chemical Constituents :-

Asparagines, saponins, flavonoids, alkaloids, mucilaginous chemicals, and certain essential oils such as α-pinene, caryophyllene, caryophyllene oxide, endesmol, farnesol, borenol, geraniol, geranyl acetate, elemene, and α-cineole are all present in the plant without exception. In addition to 28 known chemicals, the chemical composition of the entire Abutilon indicum plant was investigated. The results showed the isolation of two novel compounds, abutilin A (1) and (R)-N-(1'-methoxycarbonyl-2'-phenylethyl)-4-hydroxybenzamide (2).

Cultivation, Collection and Propagation :-

needs to be in a sunny spot or receive some shade during the day in rich, well-drained soil.The plant is now a common weed in the tropics after escaping from cultivation. Plants that are dead-headed to stop seeding can live longer. This genus of plants has notable resistance to the honey fungus.

Propagation :-

While abutilon species can be grown from seed, meaning they might take an entire year to blossom, cultivars and hybrids can be multiplied year-round using softwood cuttings. Heat from underneath will hasten roots. Rather than preserving the entire plant, late summer tip cuttings can be taken to overwinter. Loose soil that is full of organic matter, sand, and watered once it feels dry to the touch makes the ideal potting media. After the plant has had a full month of rest, watering should be cut back from November to March, and the plant should be trimmed back by one third. Scale insects frequently harm plants. It is advisable to replace the plant with new specimens every two to three years. Plant at any time of year, just enough to cover the seed.

Keeping the temperature at 75° F.

Description:-

A. Macroscopic:-

Light brown tap roots that are relatively lengthy and have several lateral branches measuring 1.5–2 cm in diameter Smooth outer surface with lenticels that resemble dots Bark is weak, astringent, bitter, and has a thin, easily peelable layer.

Microscopic:-

A thin layer of 4–7 or more tangentially elongated rectangular cells, known as the cork cambium, is visible in the transverse section of the root. This cork is single layered, and at the lenticel regions, it is followed by 2-3 layers of secondary cortex made up of thin-walled, nearly cubical or rectangular cells, most of which have small clusters of calcium oxalate. followed by three to four layers of cortical cells with thin walls, some of which are above. The main portions of bark are made up of phloem, which is present as conical strands with bases facing the wood and dilated distal ends of the primary medullary rays. The conical strands of bast, crushed tiny starch grains, 6–9 μ in diameter, present in some of the cells Between them, tangential rows of fibers that are present in groups of 10–12 in these conical strands alternate with thin-walled phloem elements in the direction of wood fiber groups. Phloem parenchyma makes up the majority of the tissue between the fibers. Some phloem cells feature starch grains, while others have cluster crystals of calcium oxalate. seem crushed and compressed on the periphery, with a cambium present inside the phloem. Parenchyma has thicker walls than fiber cells and is slightly wider, but it is not as thickened, single or Medullary rays uni or biseriate, Tetrarch bundle or primary xylem present at the center of the wood, and infrequently complex starch grains Expanding

significantly in the distal regions, the majority of the ray cells are lined with starch grains, while a small number of them toward the center of the root contain rhomboidal crystals. Some of the ray cells also contain calcium oxalate clusters.

PHYTOCHEMISTRY :-

Understanding a medicinal plant's unique chemical components is crucial for maximizing extraction techniques, assessing possible toxicity, and comprehending the plant's pharmacological activity. Many components, including lactones, sesquiterpenes, flavonoid aglycones, steroids, carbohydrates, phenols, tannins, alkaloids, flavanoids glycosides, proteins, alkaline sulphates, and amino acids, have been identified in species of A. indica.

Leaves:-

The leaves of plants include several compounds such as tannins, mucilage, organic acid, residues of asparagin, and alkaline sulphates, chlorides, magnesium phosphate, and calcium carbonate27. Ethanolic extract has 72% more quercetin than flowers, according to Rajlakshmi28. Alkaloids, sterols, titerpenoids, glycosides, essential oils, and different

Roots :-

asparagin33 is present in the roots. In 1989, Sharma and Ahmad34 reported the presence of gallic acid (8) and fixed oil in roots. In 1984, Dennis and Kumar35 reported finding β-amyrin (9) and other fatty acids in the roots of A. indicacum. The mucilage component contains galactose and galacturonic acids36.Sterols, terpenoids, terpenes, flavonoids, and steroids were all mentioned by Bhattacharjee37.

Flowers :-

Sankara and Nair38 reported that A. indica contains cyanidin-3 rutinoside and gossypetin-7- and 8-glucosides.Alantolatone and isoalantolactone, two sesquiterpene lactones, were initially discovered by Sharma et al. 39.

Seeds :-

The seed gum's branched structure was revealed by acid-catalyzed fragmentation, periodate oxidation, and methylation. It is made up of linear chain ß-D (1,4) linked mannopyranosyl units, some of which are substituted at ortho-6 by two α –D (1,6) galactopyranosyl units that are mutually linked glycosidically as end groups 1942. Stearic, linolenic, oleic, and palmitic acids were detected in the seed oil according to chemical analysis43. The crude pentosan, protein, and water-soluble mucilage contents of seeds were examined44.

PHARMACOLOGY :-

Wound Healing Activity:-

The ability of A. indicacum's ethanolic extract to treat wounds was investigated. Significant increases in wound contraction rate, skin breaking strength, granuloma strength, and dry granuloma weight were observed with this extract at a dose of 400 mg/kg.

Anti- inflammatory Activity:-

Rajurkar59 examined the anti-inflammatory properties of Abutilon indicum leaves using the HRBC membrane stabilization technique. The leaves' ethanolic, chloroform, and aqueous extracts were tested for their ability to reduce inflammation. A biphasic effect on the stability of the membrane was observed in all three fractions.

Analgesic Activity:-

Goyal et al. 64 assessed the analgesic activity of many extracts derived from the root of Abutilon indicum. Greater analgesic action was demonstrated by petroleum ether extract. The activity could be caused by peripheral analgesic pathways or central mechanisms. They thereby verified the traditional application of Abutilon indicum.

Diuretic Activity:-

The diuretic activity of A. indicum seed extract was assessed, and when compared to the reference standard furosemide, the aqueous extract at 400 mg/kg showed a statistically significant impact.

Therefore, the investigation clarified that the extract had a notable diuretic and natriuretic impact but no potassium sparing effect72.

Anti-asthmatic Activity:-:

This study found that powdered dry aerial portions of A. indica can effectively reduce the severity of bronchial asthma symptoms, such as coughing, dyspnea, tightness in the chest, and wheezing. Additionally, it was discovered to considerably improve pulmonary function in patients with mild to moderate bronchial asthma71.

MATERIAL AND METHODS :-

Extraction Method:-

The newly harvested leaves of Abutilon indicum (L.), Sweet Ssp. Indicum Family (Malvaceae), harvested during flowering in the areas of India with the highest biodiversity. The leaves of Abutilon indicum were dried in shade for 20 days, then ground into a coarse powder, which was then passed through a 40-mesh screen. The dried leaves were then extracted repeatedly using petroleum ether (60–80°C), methanol, and distilled water in a soxhlet extraction apparatus, and the residue was concentrated to a semisolid state.

PHYSICOCHEMICAL METHODS:-

A. **Extractive Value :-**

Alcohol Soluble Extractive: -

5 g of finely ground powder The medication that had been air dried was macerated for 24 hours in a closed flask with 100 cc of alcohol that had been strength-specified. After that, a rotary shaker was used to shake it constantly for six hours, and it was let to stand for eighteen hours. Filter paper was used to filter the content. The filtrate was moved to a dish with a flat bottom that had been weighed beforehand, and it was dried over a water bath. After that, the dish was held at 105º in the oven to maintain weight and balance. The medication that had been air-dried was used to calculate the proportion of alcohol-soluble extractive.

Water Soluble Extractive: -

5 grams of finely ground powder The medication that had been air dried was macerated for 24 hours in a closed flask with 100 cc of water of the specified strength. The solution was shaken for six hours in a rotary shaker before being put on a stand for eighteen hours. Content was filtered using filter paper. The filtrate was moved to a flat-bottomed plate that had been previously weighed, and it was dried on a water bath. After that, the dish was weighed and put in an oven set to 105o. The air-dried medication was taken into consideration

while calculating the percentage of water-soluble extractive.

B. **Ash Value**

Total Ash Value :-

Two grams of the medication were weighed in a silicon dish and burned at 450 degrees to create a carbon-free sample in order to calculate the sample's total ash value. Following that, a second weigh-in was performed to determine the percentage of ash value.

Acid Insoluble Ash: -

Boil the entire amount of ash for five minutes in 25 milliliters of 2M hydrochloric acid. Gather the insoluble material in a Gooch crucible or ash-less filter paper. Rinse with hot water, light, let cool in a desiccator, and weigh. Determine the percentage of acid-insoluble ash using the drug's air-drying information.

MARKETED PREPARATION:-

A. Atibala Powder :-

1. To prepare a paste, mash the leaves and seeds with some water.
2. The leaves can be consumed whole, as a juice, or as a paste.
3. You can also use a mixture of wheat flour and leaf powder.
4. You can take a fruit decoction and ammonium chloride orally with water.
5. Powdered seeds are swallowed with water.
6. You can use the plant's roots in powder form.
7. You can also utilize root infusion.

B. Wound Healing Ointment:-

After adding aloe barbadensis concentration gel powder to filtered water, it was left overnight. Phase I involved dissolving Abutilion Indicum extract, Curcuma longa extract, and the manufactured aloe gel in purified water, heating the mixture to a temperature where glycerin was added, and stirring the mixture constantly. White soft paraffin was melted to create Phase II. Cetosteryl alcohol and polysorbate 60 were added at 700C while being continuously stirred. Finally, the mixture was mixed after the addition of butylated hydroxyl anisole (BHA) and methyl and propyl paraben. At 700C, Phase II was introduced to Phase I while being continuously stirred. After that, let cool while stirring continuously.

CONCLUSION :-

A thorough review of the literature showed that fatty acids are claimed to have analgesic properties. We have chosen the Malvaceae species Abutilon indicum for phytochemical and microbiological research in previous work. Several novel sources and well-known secondary metabolites were consequently spectroscopically characterized. Four known secondary metabolites—(-) β-pinene, eugenol, geraniol, and palmitic acid—were found in Abutilon indicum leaves, as validated by the petroleum ether extracts. We also reported the extraction of 3, 3′, 4′, 5, 7-pentahydroxy flavone, (3β) –Cholest-5-en-3-ol, and stigmasterol from the chloroform extracts75. Additionally, eudesmic acid, ferulic acid, and caffeic acid have been identified in the plant's methanol extract of leaves.

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