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A Brief Description on Atibala

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ABSTRACT: ***A. indicum is a species of arum (Linn) Sweet is a hairy herb commonly known as 'Indian mallow' belonging to family Malvaceae. It thrives in the hottest regions of India, although it may also be found in the tropics, subtropics, and Ceylon. In Sanskrit, Abutilon indicum is known as 'Atibala.' The words 'Ati' and 'Bala' literally mean'very strong,' implying that the qualities of this plant are very potent. A. indicum is a hairy plant or undershrub that may be found all throughout the tropics. Roots, leaves, flowers, bark, seeds, and stems have all been used as antioxidants, demulcents, laxatives, diuretics, analgesics, anti-inflammatory, and antiulcers in traditional medicine. The current study is an attempt to provide a comprehensive overview of the literature on its pharmacognosy, phytochemistry, and traditional and pharmacological applications.***

KEYWORDS: ***Abutilon indicum, Atibala, Indian mallow, Pharamcognosy, Pharmacology, Phyto-chemistry.***

1. INTRODUCTION

A. indicum (Linn) (Linn) Sweet is a hairy herb popularly known as „Indian mallow" belonging to family Malvaceae. It thrives in the hottest regions of India, although it may also be found in the tropics, subtropics, and Ceylon. In addition to 'Atibala' it is also known as Thuthi, Kanghi in Hindi, and Mudra in Marathi.

It grows as weed and found abundantly in wastelands from seashores 1,200 meters high in India and in sub Himalayan tracts. It is herbaceous, or shrubby, softly tomentose plant, stem is round, often tinged with purple color. The leaves are 9 by 5 cm up to petiolate, ovate to orbocular –cordate, acuminate, and toothed. Flowers are borne solitary in long jointed and axilary pedicels. Calex lobes divided in the middle and apiculate. Corolla is yellow or orange yellow opens in the evening. Carpels are 15-20 in number. Fruits are hispid, scarcely longer than the calyx and awns are erect. Seeds are 3 -5, ovoid, kidney shaped, dark brown black, tuberceled or with minutely stelleate hairs. Tap roots, fairly long with a number of lateral branches: 1.5-2 cm in diameter, light brown, outer surface smooth with dot like lenticels. The bark is thin and easily peelable, with a weak odor and astringent and bitter flavors[1]–[4].

This plant is also used by traditional healers to treat blood dysentery, fever, allergies, and as an aphrodisiac. Bark is a diuretic that is used to treat strangury and urinary complaints. Toothaches, lumbago, piles, and all types of inflammation are treated with the leaves. Bronchitis, catarrhal bilious diarrhoea, gonorrhoea, bladder inflammation, and fevers are treated with a decoction of leaves. In cases of tender gums and toothache, it is prescribed as a mouthwash. Seeds are a tonic, and Unani medicine recommends them for piles, chest pains, bronchitis, and gonorrhea. Thread worm-affected children's rectums are exposed to the smoke of seeds burned on charcoal. The seeds are used as an emollient and demulcent, according to the Chinese in Hong Kong. The root infusion can be used to treat fevers, strangury, heamatouria, and even leprosy. Root is used as a sedative and diuretic for the lungs. According to Porter Smith, the entire plant, including the seeds, is used as a demulcent, lenitive, diuretic, and laxative.

Pharmacognosy:

Research paper UGC CARE Listed (Group -I) Journal Volume 11, Iss 8, August 2022

The root of A. indicum is cylindrical, measuring 1.2-1.5 cm in diameter, with a smooth surface, a salty flavor, and a yellow color. The stem is yellow and measures 0.3-0.9 cm in diameter. Evergreen, stipulated, and cordate leaves. The bark is flattened, with a hairy, yellow outer surface and a smooth interior surface. Fibrous fractures are seen. The blooms are yellow and bisexually pedicillate. The petiole is 1.5-7.0 cm in length, is yellowish brown in color, and is cylindrical with stellate hair. Crenate, reticulate, acute to acuminate, minutely stellate, dentate, dull green in color, hairy above and glaucous below, the lamina is crenate, reticulate, acute to acuminate, minutely stellate, dentate, hairy above and glaucous below. There are glandular hairs present, and the texture is coriaceous. The seeds are wrinkled, minute, and glabrous, and the fruit is a schizocarp[5]–[10].

Phyto-Chemistry:

Understanding pharmacological efficacy as well as possible toxicity and improving extraction methods requires knowledge of specific chemical components of medicinal plants.

a. *Leaves:*

Tannins, mucilage, traces of asparagin, organic acid, and alkaline sulphates, chlorides, magnesium phosphate, and calcium carbonate are found in the leaves, while the ash includes alkaline sulphates, chlorides, magnesium phosphate, and calcium carbonate. Flowers contain 72 percent more quercetin than ethanolic extract. Alkaloids, sterols, titerpenoids, glycosides, essential oils, and different amino acids are also found in the leaves. Tocopherols and – sitosterol were isolated from leaves by Baxi et al.

b. *Parts from the air:*

After extracting the aerial part of the plant with petroleum ether, fumaric, p-coumaric, vanillic, caffeic, and p-hydroxybenzoic acids, as well as gluco-vanilloyl glucose, fructose, aspartic acid, histidine, threonine, serine, and leucine, the following compounds were isolated: n-alkane mixture, an alkanol fraction, and – sitosterol Mucilage fraction contains galactose and galacturonic acids. Shoots and flowers include saponins, flavonoids, and alkaloids.

c. *Roots:*

Asparagin is found in the roots. From the root, gallic acid and fixed oil were extracted. Sterols, terpenoids, terpens, flavonoids, and steroids were found, according to Bhattacharjee.

d. *Flowers:*

Gossypetin-8 and 7-glucosides, as well as cyanidin-3-rutinoside, were extracted from A. indicum flower petals. Sharma et al. were the first to report two sesquiterpene lactones, alantolatone and isoalantolactone. Flavonoids such as luteolin, chrysoeriol, luteolin 7-O-glucopyranoside, chrysoeriol 7-O-glucopyranoside, apigenin 7-O-glucopyranoside, quercetin 3-O-glucopyranoside, quercetin 3-O-rhamnopyranosyl (1 - 6)-glucopyranoside, quercetin 3-O-rhamno Geraniol, geraniol actate, -pinene, borneol, and tetradecane were found in the oil extracted from the blooming tops.

e. *Seeds:*

Research paper UGC CARE Listed (Group -I) Journal Volume 11, Iss 8, August 2022

Seeds contain D-galactose and D-mannose in a 2:3 ratio in water soluble galactomannan. The seed-gum has a branched structure consisting of linear chain ß-D (1 4) linked mannopyranosyl units, some of which are substituted at ortho-6 by two –D (1 6) galactopyranosyl units mutually linked glycosidically as end groups, as revealed by acid catalyzed fragmentation, periodate oxidation, and methylation. Stearic, linolenic, oleic, and palmitic acids were found in the seed oil after chemical examination. The crude pentosan, protein, and water soluble mucilage contents of seeds were measured.

f. Fruits:

Flavanoids and alkaloids are found in fruits.

g. Plant in its entirety:

Quercetin, kaemferol, gossypetin, and cyanidin glycosides have all been identified from A. indicum. Two novel compounds, abutilin A (1) and (R)-N-(1'-methoxycarbonyl-2'-phenylethyl)-4-hydroxybenzamide (2), as well as 28 recognized compounds, have been isolated from the chemical components of the whole plant. Petroleum ether extract was used to isolate -sitosterol, a possible novel mosquito larvicidal chemical. Gum resin and mucilage were discovered in the plant. Tannins were not found in the plant's 50 percent ethanolic extract.

Pharmacology:

i. Activity as an Antioxidant and a Radical Scavenger:

The roots and aerial parts were extracted in nhexane, chloroform, butanol, and ethyl acetate, and total phenolic content, total flavonoid content, total antioxidant capacity (TAC), and Trolox equivalent antioxidant capacity (TEAC) were determined using 2,2′-azinobis-3-ethylbenzotiazo-line-6-sulfonic acid (ABTS) and ferric reducing anti-oxidant power (FRAP).

ii. Anti-diabetic Properties:

In an oral glucose tolerance test, the aqueous extract was given to moderately diabetic rats at doses of 0.5 and 1 g/kg body weight, resulting in a significant reduction in plasma glucose levels in 30 minutes when compared to untreated rats (P 0.05), and this was faster than using a standard antidiabetic drug, glibenclamide. The reduction of glucose absorption via the small intestine was studied using an everted intestinal sac. The extract reduced glucose absorption in a dose-dependent manner at doses ranging from 0.156 to 5 mg/mL. A dosage of 2.5 mg/mL produced the best results. The aqueous extract of the A indicum plant possesses excellent antidiabetic properties, based on the aforementioned findings.

iii. Antimalarial Properties:

The toxicity of crude hexane, petroleum ether, ethyl acetate, acetone, and methanol extracts of Abutilon indicum against Culex quinquefasciatus early fourth-instar larvae was investigated. After 24 hours, all extracts had modest larvicidal activity. Larval mortality was greatest in the petroleum ether extract. - sitosterol isolated from plants was shown to have LC50 values of 11.49, 3.58, and 26.67 ppm against Aedes aegypti L, Anopheles stephensi Liston, and Culex quinquefasciatus Say (Diptera: Culicidae), respectively.

Research paper UGC CARE Listed (Group -I) Journal Volume 11, Iss 8, August 2022

iv. Hypoglycemic Effect:

At a dosage of 400 mg/kg, p.o., alcohol and water extracts of A. indicum leaves exhibited a substantial hypoglycemic impact in normal rats 4 hours after treatment (23.10 percent and 26.95 percent , respectively). When compared to a reference medication, the alcohol and water extracts of Tolbutamide exhibited mild action, while the petroleum ether and chloroform extracts showed no significant hypoglycemic activity.

v. Properties of Estrogenic and Antiestrogenic Hormones:

At doses of 100-500 mg/kg body weight, methanolic extracts of fruits suppressed uterine peroxidase enzyme activity. The uterine peroxidase test was proposed as a biochemical measure for determining the estrogenic/antiestrogenic characteristics of novel antifertility drugs.

vi. Antimicrobial Properties:

Antibacterial activity was shown in essential oil extracted from the entire plant against Proteus vulgaris, Bacillus subtilis, and Bacillus anthracis, but not against Salmonella typhimurium, Salmonella pullorum, or Klebsiella species. In vitro antibacterial activity was found in an aqueous extract of the entire plant at a concentration of 5-10 mg/ml against E.Coli, Corynebacterium diptheriae, Streptococcus viridans, Salmonnela typhi, Shigella flexneri, Diplococcus pnumoniae, Salmonnela paratyphi A and B. Trichosporon cutaneum, Candida albicans, Candida tropicalis, Microsporum canis, Microsporum nanum, Microsporum gypseum, Piedraria hortae, Phialophora jeanselmei, Trichophyton mentagrophytes, Trichophyton rubrum, Madurella mycetomy, Histoplasma capsulatum, and Cryptococcusneo formans were all found to have

vii. Inhibitory Action of the Angiotensin Converting Enzyme (ACE):

The root extract of A. indicum was shown to inhibit ACE by 18 percent, 9 percent, and 96 percent in water, acetone, and ethanol, respectively. The enzymatic cleavage of the chromophore-fluorophorelaballed substrate dansyltriglycine into dansylglycine and diglycine was used to determine inhibition. It refers to the use of plants in the treatment of hypertension.

viii. Anti-inflammatory Properties:

The anti-inflammatory efficacy of ethanol, chloroform, and aqueous extract (1, 5, 10, 20 mg/100ml) of A. indicum leaves was tested. Anti-inflammatory efficacy was measured by preventing hypotonicity-induced HRBC membrane lysis. All of the extracts had a biphasic impact on HRBC membrane stability and activity that was similar to Diclofenac.

In commercial formulations, it's used as follows:

Ayurvedic and commercial uses for the plant abound. Atibalaghrit, Mahanarayan taila, Bala taila, and Mahavishgarbh taila are commercially accessible goods. It's also a component of Chayvanprash Linctus, a general tonic for regaining vigor and health, and Garbha Cintamani Rasa, a traditional Ayurvedic preparation for puerperal problems.

2. DISCUSSION

Research paper UGC CARE Listed (Group -I) Journal Volume 11, Iss 8, August 2022

Abutilon indicum (Indian abutilon, Indian mallow) is a tropical and subtropical shrub belonging to the Malvaceae family. The roots and leaves of this plant are used to treat fevers, making it an important medicinal and attractive plant. Outside of its native area, it has been extensively imported and is now considered invasive on several tropical islands. Ayurveda considers atibala to be balya, which indicates it boosts strength, vigor, and energy. It's used to treat facial paralysis and joint pain. It's also used as a tonic for the uterus and as an aphrodisiac. Gout, TB, ulcers, blood problems, and worms all benefit from it. Digestive, laxative, expectorant, diuretic, astringent, analgesic, anti-inflammatory, anthelmintic, demulcent, and aphrodisiac are some of the uses. Atibala fibres are used in the production of ropes, cordages, jute dyes, medicines, carpets, wrapping cloth, tissue papers, coarse cloth, cigarette paper, rubber, tyres, textiles, and shoe polishes, among other things.

3. CONCLUSION

A thorough review of the literature showed that A. indicum is a significant Ayurvedic herb. It's been used to make ayurvedic medicines for a long time. Saponins have hypoglycaemic and antifungal properties in medicine. The plant's fatty acids linoleic, oleic, palmitic, lauric, stearic, and others claim to have analgesic properties. Antipyretic properties have been found for -sitosterol, as well as hypoglycaemic properties for flavonoids. Furthermore, the plant's gum and resin are used to treat rheumatism and have an antiplasmitary effect, indicating that it has been utilized for a variety of reasons from ancient times. As a result, the phytochemicals present within may be used in a variety of allopathic treatments to improve pharmacological rationale therapy.

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