



Research Paper

Medicinal properties of *Abutilon indicum*

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ABSTRACT

Abutilon indicum is a common Indian shrub, belonging to the family Malvaceae; also known as Mallow in English. *A. indicum* is used as a medicinal plant. It has been extensively used in traditional medicine as a laxative, emollient, analgesic, anti-diabetic, anti-inflammatory and blood tonic agent and also in the treatment of leprosy, urinary disease, jaundice, piles, relieving thirst, cleaning wounds and ulcers, vaginal infections, diarrhea, rheumatism, mumps, pulmonary tuberculosis, bronchitis, allergy and blood dysentery including some nervous and ear problems. Various studies on the plant extract have been performed to confirm the anti-oxidant, anti-bacterial, analgesic, anti-inflammatory, anti-cancer, hepato-protective, immuno-modulatory and larvicidal activities of the plant. This plant is often used as a medicinal plant and is considered invasive on certain tropical islands. In traditional medicine, *A. indicum* is used as an aphrodisiac, demulcent, diuretic, laxative, and pulmonary and sedative (leaves). The bark is astringent and diuretic; laxative, expectorant and demulcent (seeds); laxative and tonic, anti-inflammatory and anthelmintic (plant); analgesic (fixed oil); diuretic and for leprosy (roots). The plant is very much used in Siddha medicines. In fact, the bark, root, leaves, flowers and seeds are all used for medicinal purposes by Tamils. The leaves are also used to treat pile complaints, while the flowers are traditionally used to increase semen in men. The phytochemical analysis showed the presence of alkaloid, saponins, amino acid, flavonoids, glycosides and steroids. This plant exhibits several potential pharmacological activities. A review on the various studies on the plant has been provided for the purpose of understanding its medicinal properties.

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INTRODUCTION

Abutilon indicum, commonly called “Thuthi” or “Kanghi” in hindi, is a native plant of South Asia. Nature is a best friend of our pharmacy field. Natural drugs are effective in action without side effects. *A. indicum* (Linn.) sweet (Malvaceae) commonly called ‘Country Mallow’ is a perennial plant that is up to 3 m in height. Medicinal plants are the nature’s gift to humans to make disease free healthy life. It plays a vital role in preserving our health.

India is one of the most medico- culturally diverse countries in the world where the medicinal plant sector is a part of time- honored tradition that is respected in the present day world. Here, the main traditional systems of

medicine include Ayurveda, Unani and Siddha (Kotnis et al., 2004). In India, different parts of medicinal plants are used for curing various diseases from ancient times. In this regard, one of such plant is *A. indicum*.

The *Abutilon* L. genus of the Malvaceae family comprises about 150 annual or perennial herbs, shrubs or even small trees widely distributed in the tropical and subtropical countries of America, Africa, Asia and Australia. Some of the plants belonging to the species are amongst much acclaimed Ayurvedic herbs and in the recent past there has been a renewed scientific interest in exploring the specie (Sikorska and Matlawska, 2008).

DISTRIBUTION

Abutilon indicum (Linn.) belonging to the family Malvaceae is commonly called 'Country mallow' (English), 'Kanghi' (Hindi) and 'Atibala' (Sanskrit). It is a perennial shrub, softly tomentose and up to 3 m in height. The plant is found in India, Sri Lanka, topical regions of America and Malesia (3). It is found as a weed in sub-Himalayan tracts, hills up to 1200 m and in hotter parts of India.

BOTANICAL DESCRIPTION

The leaves are ovate, acuminate, toothed and rarely subtrilobate having a length that varies from 1.9 to 2.5 cm. The flowers are yellow in color with peduncle jointed above the middle. The petioles are 3.8 to 7.5 cm long; stipules 9 mm long; pedicels often 2.5 to 5 mm long, axillary solitary and jointed very near the top; calyx is 12.8 mm long, divided into middle, lobes ovate, apiculate and corolla 2.5 cm diameter, yellow, opening in the evening. The fruits are capsule and densely pubescent, with conspicuous and horizontally spreading beaks. The stems are stout, branched, 1 to 2 m tall and pubescent. The seeds are 3 to 5 mm, reniform, tubercled or minutely stellate-hairy, black or dark brown (Kirtikar and Basu, 1994; Nadakarni, 1995).

The medicinal qualities of *A. indicum* are quite similar to those of the plant: *Bala Sida cordifolia*.

Synonyms: Rishyaprokta, Kankatika, Balika, Rishagadha and Bhuribala; *Sida indica* L.

Vernacular names of *Abutilon indicum*

The vernacular names of *A. indicum* are:

- 1) Hindi: Kanghi, Kakahi;
- 2) English: Country mallow, Indian mallow;
- 3) Bengali: Petari;
- 4) Malayalam: Dabi, Uram;
- 5) Gujarati: Khapat, Kanshi, Dabli;
- 6) Marathi: Mudra, Petari;
- 7) Tamil: Tutti, Paniara, Hutti;
- 8) Telugu: Tutturubenda.

SCIENTIFIC CLASSIFICATION

The scientific classification of the plant, *A. indicum* is as follows:

- 1) Kingdom: Plantae;
- 2) Order: Malvales;
- 3) Family: Malvaceae;
- 4) Genus: *Abutilon*;

5) Species: *Abutilon indicum*.

Common name

The common names of *A. indicum* are *Abutilon*, Indian mallow.

Habitat

It is present in sub-Himalayan tract and hills up to 1,200 m and hotter parts of India.

TRADITIONAL APPLICATIONS

It is useful in gout, tuberculosis, ulcers, bleeding disorders, and worms. It can be used as Digestive, laxative, expectorant, diuretic, astringent, analgesic, anti-inflammatory, anthelmintic, demulcent and aphrodisiac. Decoction used in toothache and tender gums. Demulcents of leaves are locally applied to boils and ulcers. Roots are prescribed in fever, chest infection and urethrities. *A. indicum* (Linn.) is 3 m in height (Figure 1). Traditionally, Root and bark are used as aphrodisiac, anti-diabetic, nervine tonic and diuretic. Seeds are used in urinary disorders. The seeds are used as a laxative in piles and in the treatment of cough. The phytochemical investigation of *A. indicum* leaves showed the presence of amino acids, glucose, fructose and galactose. From the roots, non-drying oil consisting of various fatty acids viz. linoleic, oleic, stearic, palmitic, lauric, myristic, caprylic, capric and unusual fatty acid having (Chatterjee and Prakash, 1991) carbon skeleton, sitosterol and amyirin from unsaponifiable matter were yielded.

RESEARCH ON ABUTILON INDICUM

The research on *A. indicum* revealed that the plant possesses analgesic, anti-inflammatory, anti-diabetic and anti-oxidant potentials.

MAJOR CHEMICAL CONSTITUENTS

The major constituents of this plant are: Hescoses, n-alkane mixtures, alkanols, B sitasterol, Vanillic, p-coumaric, acceic, fumaric and amino acids, alantolactone and iso alantolactone etc.

ANTIOXIDANT AND ANTIBACTERIAL ACTIVITY OF *A. INDICUM*

The antioxidant and antibacterial activity of *A. indicum* and

A. muticum were investigated in this research. Total antioxidant activity of both oils was checked using ABTS, FRAP, DPPH and oleic acid peroxidation methods. These methods indicated the presence of both the slow reacting and fast reacting components in the seed oils of both herbs. The seed oil of *A. indicum* and *A. muticum* showed broad spectrum activities as they were active against gram-positive and gram-negative bacteria. The findings revealed seeds of *Abutilon species*, indigenous to Pakistan to be a potentially valuable herb for oil production, delivery of drugs and cosmetic active ingredients (Kashmiri et al., 2009).

ANALGESIC ACTIVITY OF *A. INDICUM*

Analgesic potential of various extracts of root of *A. indicum* Linn was evaluated by Rajurkar et al. (2009). They subjected the powdered root (900 g) to successive solvent extraction with solvents in increasing order of polarity: petroleum ether (60 to 80°C), methanol and ethanol by Soxhlet apparatus for 72 h. They extracted marc by cold maceration for 72 h to obtain water soluble extract. Peripheral analgesic activity was studied using acetic acid induced writhing method in Swiss albino mice (20 to 30 g), while central analgesic activity was evaluated by tail flick method and tail immersion method. Results indicated that all the tested extracts except methanol extract exhibited significant analgesic activity in both animal models. Petroleum ether extract showed higher analgesic activity. The activity may be related to central mechanism or due to peripheral analgesic mechanisms. Thus, they authenticated the traditional use of *A. Indicum*.

ANTI-INFLAMMATORY ACTIVITY OF *A. INDICUM*

Anti-inflammatory action of *A. indicum* (L.) sweet leaves by HRBC membrane stabilization technique was investigated. The ethanolic, chloroform and aqueous extracts of the leaves were screened for anti-inflammatory activity. They took the prevention of hypotonicity induced HRBC membrane lysis as a measure of anti-inflammatory activity. All three fractions showed a biphasic effect on the membrane stabilization. Their activities were found to be comparable to that of standard drug diclofenac sodium. However, their activities decreased with time. The extracts were supposed to act either by inhibiting the lysosomal enzymes or by stabilizing the lysosomal membrane (Rajurkar et al., 2009).

ANTICANCER ACTIVITY OF *A. INDICUM*

The study of medicinal plants namely *A. indicum* and *Blumea mollis* were chosen to screen for potential anti-

oxidant properties and cytotoxic activity. The extract was also screened to assess the antioxidant activity using FRAP, 1, 1-Diphenyl-2-picrylhydrazyl [DPPH] radical scavenging activity and nitric oxide radical inhibition estimated by the use of Griess Illosvoy reaction with slight modification. These extracts show anti-oxidant properties as well as, inhibitory effect on cancer cells with increased concentration and duration (Porchezian and Ansari, 2005).

HEPATOPROTECTIVE ACTIVITY OF *A. INDICUM*

A study was carried out to determine the hepatoprotective activity of aqueous leaf extract of the plant against carbon tetrachloride- and paracetamol- induced hepatotoxicity. The LD₅₀ value of the extract was found to be higher than 4 g/kg body weight when administered orally to rats. The study also showed that treatment of rats with carbon tetrachloride and paracetamol increased the levels of serum glutamic oxaloacetate transaminase, serum glutamic pyruvate transaminase, alkaline phosphate, total bilirubin and direct bilirubin and decreased liver glutathione levels.

Pre-treatment with the extract decreased the levels of serum glutamic oxaloacetate transaminase, serum glutamic pyruvate transaminase, alkaline phosphate, total bilirubin and direct bilirubin and increased liver glutathione levels restoring normalcy. This effect was comparable to that of the standard silymarin. The mechanism of action of the extract was found to be due to interference with cytochrome P450 which blocked the production of free radicals. It has been speculated that in the case of paracetamol induced hepatotoxicity, the hepatoprotective effect of the extract could be due to promotion of glucuronidation (Appaji et al., 2009).

IMMUNO MODULATION ACTIVITY *A. INDICUM*

“Bala compound” is an Ayurvedic preparation which is used to protect infants from common diseases by stimulating their immune system. One of the major ingredients of this Ayurvedic preparation is *A. indicum*. A clinical study with this compound confirmed that administration of the compound to neonates resulted in an increase in antibody levels such as IgG, IgM and IgA after three to six months of administration (Surendra and Naveen, 2010).

The immunomodulatory activity of ethanolic and aqueous extract of leaves of *A. indicum* (200 and 400 mg/kg) by hemagglutination antibody (HA) titre delayed type hypersensitivity (DTH), neutrophil adhesion test and carbon clearance test. The study revealed that the extract showed significant increase in both primary and secondary HA titre. It also showed significantly potentiated DTH reaction and increase in percentage neutrophil adhesion test.

The results of the study reported that both extracts were found to have a significant immunostimulatory activity on both the specific and non-specific immune mechanisms. This activity was said to be attributed to the presence of flavonoids (quercetin), alkaloids, tannins, saponin glycosides and phenolic compounds (Abdul et al., 2008).

LARVICIDAL ACTIVITY OF *A. INDICUM*

Larvicidal activity of crude ethyl acetate, hexane, acetone, petroleum ether and methanol extracts of five medicinal plants such as *A. indicum*, *Aegle marmelos*, *Jatropha gossypifolia*, *Euphorbia thymifolia* and *Solanum torvum* were assayed for their toxicity against the early fourth-instar larvae of *Culex quinquefasciatus*. The larval mortality was observed after 24 h exposure. All extracts demonstrated moderate larvicidal effects. However, the maximum larval mortality was found in petroleum ether extract of *A. indicum*.

In the present study, bioassay-guided fractionation of *A. indicum* led to the separation and identification of a β -sitosterol as a potential new mosquito larvicidal compound with LC₅₀ value of 11.49, 3.58 and 26.67 ppm against *Aedes aegypti* L, *Anopheles stephensi* Liston and *C. quinquefasciatus* Say (Diptera: Culicidae), respectively. H NMR, C NMR and mass spectral data confirmed the identification of the active compound.

β -sitosterol has been recognized as the active ingredient of many medicinal plant extracts. All the crude extracts when screened for their larvicidal activities indicated toxicity against the larvae of *C. quinquefasciatus*.

This article reports the isolation and identification of the β -sitosterol as well as, bioassay data for the crude extracts. There are no reports of β -sitosterol in the genus, *A. indicum* and their larvicidal activities are being evaluated for the first time. Results of this study demonstrated that the petroleum ether extract of *A. indicum* may be considered as a potent source and β -sitosterol as a new natural mosquito larvicidal agent.

CONCLUSION

The extensive survey literature reviewed that *A. indicum* Linn, is an important medicinal plant with diverse pharmacological spectrum. Lots of pharmacological studies have been carried out with extract of the different parts of the plant. The present review summarizes some important pharmacological studies on hepatoprotective, wound healing, immunomodulatory, analgesic, antimalarial, antimicrobial and hypoglycemic activity of *A. 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 *A. indicum* and further clinical and pharmacological investigation should be conducted to investigate unexploited potentials of this plant.

A. indicum have many more pharmacological properties such as the main chemical constituents being carbohydrates, steroids, glycosides, flavonoids, tannins and phenolic compounds. Hence, in this review article, effort has been taken to collect and compile detail notes on *A. indicum* which will be useful to the society to venture into a field of alternative systems of medicine.

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