

ABUTILONS INDICUM LINN: A PHYTOPHARMACOLOGICAL REVIEW

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ABSTRACT

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. The plant is documented to possess beneficial effects as sweet, cooling, digestive, laxative, expectorant, diuretic, astringent, analgesic, anti-inflammatory, anthelmintic, demulcent and aphrodisiac. The plant contains saponins, flavonoids, alkaloids, hexoses, n-alkane mixtures (C₂₂₋₃₄), alkanols, and amino acids as main classes of compounds. A scrutiny of literature revealed some notable pharmacological activities like antibacterial, antipyretic, antimalarial, antifertility, hepatoprotective, hypoglycemic and wound healing. The present review is an attempt to highlight the various ethnobotanical and traditional uses as well as phytochemical and pharmacological reports on *Abutilon indicum*.

Keywords: *Abutilon indicum*, Phytochemistry, Pharmacotherapeutics.

INTRODUCTION

Medicinal plants are part and parcel of human society to combat diseases, from the dawn of civilization¹. Medicinal plants can be important source of previously unknown chemical substances with potential therapeutic effects. The medicinal use of plants is an ancient tradition, far older than the contemporary sciences of medicine, pharmacology and chemistry. The world health organization has estimated that over 75% of the world's population still relies on plant derived medicines, usually obtained from traditional healers, for its basic health care needs². Herbal medicines are in great demand in the developed as well as developing countries for primary healthcare because of their wide biological and medicinal activities, higher safety margins and lesser costs³. *Abutilon indicum* (Linn.) family Malvaceae; commonly called as 'Country mallow' (English), 'Kanghi' (Hindi) and 'Atibala' (Sanskrit). It is a perennial shrub, softly tomentose and up to 3 m in

height. *Abutilon indicum* (Linn) is an important medicinal plant used in our Traditional System of Medicine to treat various health ailments. The plant is used as demulcent, aphrodisiac, laxative, diuretic, pulmonary and sedative. The plant is found in India, Sri Lanka, tropical regions of America and Malesia. It is found as a weed in sub-Himalayan tracts, hills up to 1200 m and in hotter parts of India. The leaves are used as astringent, bark is used as diuretic and seeds are used as laxative, expectorant and demulcent. The plant contains mucilage, tannins, asparagines, gallic acid and sesquiterpenes. The flowers are yellow in color, peduncle jointed above the middle. The petioles 3.8-7.5 cm long; stipules 9 mm long; pedicels often 2.5-5 mm long, axillary solitary, jointed very near the top; calyx 12.8 mm long, divided in to middle, lobes ovate, apiculate and corolla 2.5 cm diameter, yellow, opening in the evening. The fruits are capsule, densely pubescent, with conspicuous and horizontally spreading beaks. The stems

are stout, branched, 1-2 m tall, pubescent. The various parts of *A. indicum* such as roots, leaves and seeds are documented to possess various medicinal properties in ethnobotanical surveys conducted by ethnobotanists and in traditional systems of medicine such as Ayurveda. *A. indicum* showed the presence of amino acids, glucose, fructose and galactose have been isolated from the leaves. From the roots non – drying oil consisting of various fatty acids such as linoleic, oleic, stearic, palmitic. Lauric, myristic, caprylic, capric and unusual fatty acid having C17 carbon skeleton besides sitosterol, The present attempt is to review and compile updated information on various aspects of *Abitulon indicum* Linn. Plant used all over the world.

a) Macroscopic

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, bark thin and can be easily peeled off, odour, feeble, taste, astringent and bitter.

b) Microscopic

Transverse section of root shows a thin cork of 4-7 or more tangentially elongated rectangular cells, cork cambium, single layered, and at the lenticel regions followed by 2-3 layers of secondary cortex of thin-walled, almost cubical or rectangular cells, containing small clusters of calcium oxalate in most of cells, phellogen followed by 3-4 layers of thin-walled cells of cortex, some cells of cortex which are above the conical strands of bast, crushed, small starch grains, 6-9 μ in diameter, present in some of the cells, phloem forms the major portions of bark and present as conical strands with their bases towards the wood and with dilate distal ends of the primary medullary ray in between them, fibres, present in groups of 10-12 in these conical strands, in tangential rows, alternating with thin-walled phloem elements, towards wood fibre groups, element in between the fibres mostly consists of phloem parenchyma, Some cells contain cluster crystals of calcium oxalate and a few others have starch grains, some phloem cells towards periphery appear compressed and crushed, inner to phloem, a cambium present, parenchyma thick-walled and slightly wider than fibre cells, but less thickened, single or rarely compound starch grains present, tetrach bundle or primary xylem present at the centre of wood, medullary rays uni or biseriate widen much towards distal ends, most of the ray cells contain starch grains and some contain cluster of calcium oxalate, starch grains present in wood larger than those of

bark region, a few ray cells at centre of the root contain rhomboidal crystals.

PHYTOCHEMISTRY

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 C17 carbon skeleton, sitosterol, and amyirin from unsaponifiable matter were yielded³. Kuo et al.⁷ isolated two new compounds, abutilin A and (*R*)-*N*-(1'-methoxycarbonyl-2'-phenylethyl)-4-hydroxybenzamide, as well as 28 known compounds. Extract of the whole plant is said to possess decreasing peroxidative damage in liver through free radical scavenging activity due to its flavonoids⁸. Petroleum ether extract of this plant is also a potent source of natural mosquito larvicidal agent⁹. Seven flavonoid compounds including quercetin and its glycosides have been isolated from flowers of *A. indicum*¹⁰. Alkaloids, flavonoids, steroids, terpenoids and saponins have been isolated and characterized from genus *Abutilon*. Previous phytochemical investigations of *Abutilon indicum* showed it to contain two sesquiterpene lactones, gallic acid, β -sitosterol, geraniol and caryophylline compounds in plants is of considerable commercial importance, since it is known that they contribute to the flavour.

PHARMACOLOGY

Almost all the parts of *Atibala* are of medicinal importance and used traditionally for the treatment of various ailments. The roots of the plant are considered as demulcent, diuretic, in chest infection and urethritis. 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, and alexeteric, astringent and diuretic. The seeds are used in piles, laxative, expectorant, in chronic cystitis, gleet and gonorrhoea. Each tribal group is having their own tradition, folk language, beliefs and knowledge about use of natural resources as medicines. Almost all the parts of this plant are documented to be useful in ethnobotanical surveys conducted by ethnobotanists. It has been documented that the natives of India, Malaya, Philippine Islands and Indochina use its parts for medicinal purposes such as febrifuge, anthelmintic, antiemetic, anti-inflammatory, in urinary and uterine

discharges, piles and lumbago. The leaves and seeds are crushed with water to form pastes which is applied to penis to cure syphilis. The root of the plant is used to treat gonorrhoea and leprosy. Root infusion is given to cure fever, dry cough and bronchitis.

Diuretic activity

Diuretic activity of *Abutilon indicum* Linn (Sweet) seed extract was reported by Gunasekaran Balamurugan and co-workers. The results stated that extract at 200 and 400 mg/kg, produced significant diuretic and natriuretic effect but not a potassium sparing effect⁷.

Antimycotic activity

Antimycotic activity of the components of *Abutilon indicum* (Malvaceae) is reported by Rajalakshmi Padma Vairavasundaram and co-workers. The screening for the antimycotic activity was performed by testing minimum inhibitory concentration and disc diffusion method. The results of present work reported that methanolic extract of leaves of *Abutilon indicum* shows remarkable antifungal activity against *Trichophyton Rubrum*⁸.

Anti-arthritic activity

Anti-arthritic activity of *Abutilon indicum* was reported by Vallabh despandey and co-workers. Various *in-vitro* anti-arthritic pharmacological models were studied and the results conclude that herbal extract of *Abutilon indicum* showed dose dependent activity which was found to be better than that of acetyl salicylic acid⁹.

Anti-inflammatory and Anti-asthmatic activity

Anti-inflammatory and Anti-asthmatic activity was reported by Archana N. Paranjape and co-workers by carrying out various experimental studies. *Abutilon indicum* showed significant anti-inflammatory activity when estimated using carageenan induced rat paw edema model. The results of this study indicated that possible mechanism of action of *Abutilon indicum* in the treatment of bronchial asthma is its mast cell stabilizing and anti-inflammatory activity¹⁰.

Hypoglycemic activity

Hypoglycemic activity of *Abutilon indicum* was assessed by S. Adisakwattana and co-workers. In this study, methanolic leaf extract of *Abutilon indicum* was investigated for hypoglycaemic effect in normal and streptozotocin-induced diabetic rats. The results suggested that the extract of *Abutilon*

indicum would be effective for lowering and suppressing elevation of blood glucose level¹¹.

Anticonvulsant activity

Dharmesh K. Golwala and co-workers have evaluated *Abutilon indicum* leaves for Anticonvulsant activity. The results of present study revealed that 100 mg/kg and 400 mg/kg of *Abutilon indicum* extract exhibited a significant anti-convulsant effect by increasing latency, onset of clonic convulsion and decreases onset of tonic seizures¹².

Wound healing activity

S. Roshan and co-workers have evaluated *Abutilon indicum* for wound healing activity. They reported that ethanolic extract of *A. indicum* at a dose of 400 mg/kg shows exhibited significant wound healing activity¹³.

Anti-diarrhoeal activity

Anti-diarrhoeal activity of *Abutilon indicum* was assessed by VM Chandrasekhar and coworkers. They reported that methanolic and aqueous extract possessed significant anti-diarrhoeal activity in castor oil induced diarrhea and prostaglandin E2-induced diarrhea¹⁴.

Antimalarial activity

A. A. Rahuman and co-workers stated that β -sitosterol isolated from the petroleum ether extract of leaf of *A. indicum* showed mosquito larvicidal activity¹⁵.

Hepatoprotective activity

Abutilon indicum showed significant hepatoprotective activity against carbon tetrachloride and paracetamol induced hepatotoxicity. This study was performed by GK Dash and co-workers¹⁶. *Abutilon indicum* indicate the immense potential of this plant in the treatment of conditions such as asthma and inflammation etc. However, the diverse pharmacological activities of *Abutilon indicum* have only been assayed in laboratory animals and the results obtained may not necessarily be transferable to the situation in humans.

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