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Incredible health benefits of Adusa (*Adhatoda vasica*)

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Abstract

Adusa is a well-known herbal remedy used in Unani system of medicine for its beneficial effects, especially in bronchitis. The herb containing fresh, dried, ripe leaves of *Adhatoda vasica* Nees, Family Acanthaceae, is a sub-herbaceous bush which grows and found throughout the year in plains and sub-Himalayan tracts in India, ascending up to 1200 m., flowering occurs during February-March and also at the end of rainy season. Adusa leaves, bark, root bark, fruit and flowers help to remove intestinal parasites. Adusa herb is used in the treatment of cold, cough, bronchitis and asthma. In acute bronchitis especially when the sputum is thick and sticky, it gives unfailing relief. Its action on liquefying the sputum makes it easier for body to expel sputum. It's dried leaves may be smoked to get relief from asthma. Local application of poultice of adusa leaves is also used with beneficial results over rheumatic joints, inflammatory swellings and fresh wounds. Scabies and other skin diseases may also be treated with a warm decoction of its leaves. In this paper general medicinal uses and pharmacological activities of various parts of this plant have been discussed and reviewed.

Keywords: Adusa, *Adhatoda vasica*, Unani medicine, traditional uses, health benefits

Introduction

Adhatoda vasica Nees (family Acanthaceae), commonly known as adusa or vasaka, also called malabar nut tree. It is a popular herb of Unani system of medicine due to its beneficial effects, especially in respiratory disorders. It is an evergreen shrub found in many regions of India and around the world. Adusa leaves have a stimulating effect on the respiratory system. Adusa possesses antispasmodic and expectorant properties, and has been used with great success in treating asthma, chronic bronchitis, and other respiratory conditions for centuries. It's boiled leaves may be helpful in treating rheumatic pain, and to relieve the pain of urinary tract infections. Its abortifacient properties have also been established. In some parts of India, it is also used to stimulate uterine contractions, thereby speeding up delivery ^[1].

Vernacular names ^[2]

Urdu: Adusa, Basa
Persian: Bansa
Assamese: Titabahak, Bahak, Vachaka
Bengali: Baksa, Vasaka
English: Vasaka
Gujarati: Aduso, Ardusi, Adulso
Hindi: Aduss, Arusa
Kannada: Adsale, Adusoge, Atarusha, Adsole, Adasale
Kashmiri: Vasa
Malayalam: Attalatakam, Atalotakam
Marathi: Vasa, Adulsa
Oriya: Basanga
Punjabi: Bhekar, Vansa, Arusa
Sanskri: Vasaka
Tamil: Vasambu, Adathodai
Telugu: Addasaramu

Plant description

Family of *Adhatoda vasica* Nees is Acanthaceae. It occurs throughout the year and known as timeless shrub measuring 1-3 feet in height with many long opposite branches. The leaves are large and lance-shaped. Stem is herbaceous above and woody below.

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Leaves are opposite and estipulate. Flowers have spikes or panicles and are small irregular zygomorphic, bisexual and hypogynous^[3]. It has capsular four seeded fruits. Color of the flower is either white or purple. Inflorescences in auxiliary spicate cymes, densely flowered; peduncles short;

bracts broadly ovate, fallacious. Leaves, flowers, fruits and roots of the plants are extensively used for treating chronic bronchitis, cold & cough, whooping cough, asthma and also used as sedative, antispasmodic and expectorant^[4].



Fig 1: Whole Plant



Fig 2: Fresh leaves



Fig 3: Dried leaves

Temperament

Mizaj: Hot² Dry²^[5].

Parts Used: Leaf and flower^[5].

Chemical constituents

The incredible health benefits and treasure trove pharmacological uses of adusa are because of its rich concentration of alkaloids^[6, 7]. The main alkaloid found in adusa leaves is a quinazoline alkaloid known as vasicine^[8]. Additionally to vasicine, alkaloids like l-vasicinone, deoxyvasicine, maiontone, vasicinolone and vasicinolare also present in the leaves and roots of adusa^[7]. Research suggests that these chemicals are responsible for bronchodilatory effect of adusa^[9, 10]. There has also been a report of thrombopoietic (platelet increasing) activity with vasicine^[11]. The leaves of adusa are rich in vitamin C and carotene.

Identity, purity and strength^[2].

Foreign matter: Not more than 2 percent

Total ash: Not more than 21 percent

Acid-insoluble ash: Not more than 1 percent

Alcohol-soluble extractive: Not less than 3 percent

Water-soluble extractive: Not less than 22 percent

TLC

T.L.C of the pet. using pet. ether: ethyl acetate (24:1) extract on silica gel 'G' plate shows five major spots on spraying with 5% methanolic-sulphuric acid reagent and heating plate for about ten minutes at 110 °C at Rf. 0.94, 0.42, 0.32, 0.24 and 0.13^[2].

Therapeutic uses and health benefits

Anti-asthmatic and bronchodilator activity: In Unani system of medicine adusa has been used mainly to treat respiratory disorders. Vasicine and vasicinone are well established as therapeutical respiratory agents; both of them are the primary alkaloid constituents of adusa^[11]. Extracts of adusa's leaves and roots are used in the treatment of bronchitis, and other lung and bronchiole disorders, as well as common cough & cold. It's leaves decoction gives soothing effect on irritation in throat, and also act as an expectorant by liquefying phlegm in the respiratory passages. In order to explore the antitussive properties, experimental studies were conducted on anesthetized guinea pigs and rabbits using extract of adusa which showed that

plant possesses good antitussive activity^[12]. Both *in vitro* and *in vivo* bronchodilatory activity using vasicine have been established in recent investigations^[13].

Wound healing activity: For the purpose of the study, wounds were created along the vertebral column of buffalo calves, then alcoholic and chloroform extracts of adusa in a powdered form were applied. In comparison to control group, the calves treated with adusa showed significant improvement in healing. Role of adusa in wound repair tissue was studied; showed improved breaking strength, tensile strength, absorption and extensibility. In addition to this, animals treated with adusa showed increased levels of elastin, collagen, hydroxyproline, hexosamine and zinc^[14].

Anti-ulcer activity: *Adhatoda vasica* has also been studied for its anti-ulcerogenic activity against ulcers induced by ethanol, pylorus, and aspirin. In a controlled study; powder of dried leaves of adusa showed substantial anti-ulcer activity in experimental rats. The highest degree of activity was observed in the ethanol-induced ulceration model^[6]. These results suggest that *Adhatoda vasica* has immense potential as an anti-ulcer agent in addition to its traditionally established pharmacological activities. Further research showed that syrup of adusa improved symptoms of dyspepsia^[15].

Chologogue activity: In laboratory experiments when animals were given an intravenous dose of 5 mg/kg, *Adhatoda vasica* was found to increase bile activity. Study on dogs showed that the amount of bile excretion was increased by 40-100%. The animals also showed an increase in bilirubin excretion^[16].

Anti-allergy activity: An extract composed of vasicinol and 20% vasicine inhibited ovalbumin-induced allergic reactions by about 37% at a concentration of 5 mg^[17]. Potent anti-allergic effects of vasicinone have been established in experiments conducted on mice, rats and guinea pigs^[18].

Anti-tubercular activity: *Adhatoda* alkaloid vasicine, produces chemical constituents bromhexine and ambroxol, two widely used mucolytics. Growth inhibitory effects on *Mycobacterium tuberculosis* of these chemicals have been established. Adusa also has indirect effects on tuberculosis by increasing lysozyme and rifampicin levels in bronchial

secretions, lung tissue and sputum; which indicates that it may be used as adjuvant in the treatment of tuberculosis [19, 20].

Abortifacient and uterotonic activity: *Adhatoda vasica* has been used for inducing abortion and for stimulating uterine contractions in order to speed childbirth because of its abortifacient and uterotonic properties respectively [1]. Significant uterotonic activity of the alkaloid vasicine has been demonstrated through studies on human subjects. This pharmacological action appears to be induced by the presence or absence of certain estrogens. In a research, human myometrial strips taken from the uterus of both pregnant and non-pregnant women were treated with *Adhatoda* to study activity of vasicine in stimulating uterine contractions. The herb was found to induce uterine contractions, with effectiveness similar to the drug oxytocin [21]. Anti-reproductive properties of *Adhatoda vasica* were also anecdotally confirmed by local women during the research period [22]. Abortifacient properties of *Adhatoda* were also demonstrated through animal studies. In a study, aqueous or 90% ethanol plant extract was orally given to rats and guinea pigs for 10 days after insemination. It was found that extract of leaf of *Adhatoda vasica* at doses equivalent to 175 mg/kg was 100% abortive [23]. Abortifacient effect of *Adhatoda vasica* was also shown in guinea pigs, with varied effectiveness according to the stage of pregnancy. More pronounced results were found when estrogens were used as a priming influence; this indicates that the action of vasicine was probably mediated via release of prostaglandins [24].

Insecticidal activity: Use of *Adhatoda* as an insecticide has been prevalent for centuries in India. Its leaves have been shown to control insect pests both in laboratory and warehouse conditions [25]. Many research have showed antifertility activity against several insect species, may due to its action on blocking the oviduct. Research has also proven *Adhatoda*'s effectiveness as an insect repellent [26].

Anti-bacterial activity: A leaf extract was investigated for antibacterial activity using the paper disc and dilution methods. *In vitro* studies on *Adhatoda*'s alkaloids showed a strong activity against the bacteria *Pseudomonas aeruginosa*. It was also noted that it possesses significant antibacterial activity against the gram-positive bacteria strains like *Streptococcus faecalis*, *Staphylococcus aureus*, *Staphylococcus Epidermidis* and against the gram-negative bacteria like *Escherichia coli* [27].

Conclusion

Adhatoda vasica has many biological activities that have been proved by many experimental studies. It represents a class of herbal medicine that has very strong conceptual or traditional base and a strong experimental base for its use. Main alkaloid present in the leaves of the plant is vasicine, which causes small but persistent bronchodilatation. It also contains an essential oil which is mainly responsible for the expectorant action of the plant. Other alkaloids like vasicinone, vasicinolone and vasicol are also present in the leaves and roots; they contribute to the bronchodilatory effect of the plant through anticholinergic action on the vagal innervation of the bronchi. The plant has great potential in treating various disorders but there is still scope

and need to further conduct clinical trials to prove its clinical efficacy.

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