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Justiciaadhatoda for Antiinflammatory Activity

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ABSTRACT

the perennial evergreen bush justicia adhatoda l acanthaceae also called vasaka or adulsa is found throughout tropical and subtropical asia india bangladesh sri lanka and other places its widespread historic use in indian traditional medicinal system includes treatments for skin disorders menstruation issues tuberculosis and bronchial symptoms like bronchitis and asthma the use of all plant partsleaves roots flowers bark and fruitsin the treatment of various illnesses is highlighted by ethnobotanical knowledge which emphasizes the plants potential as an expectorant antispasmodic bronchodilator and antipyretic numerous bioactive substances have been identified through phytochemical research including flavonoids saponins tannins phenolics glycosides essential fatty acids minerals and quinazoline alkaloids vasicine vasicinone and vasicoline.justicia adhatoda contains over 233 compounds included alkaloids like vasicine. its leaves its extracts demonstrate antibacterial and anti-inflammatory effects effectively inhibiting pathogens.its traditional use in treating bronchial issues and inflammation.

KEY WORDS: Nanoemulgel, Justicia adhatoda, Anti inflammatory, Alkaloids, vasicine.

I. AIM AND OBJECTIVE

The primary goals are to create and assess a nanoemulgel using Justicia adhatoda extract for improved transdermal distribution and anti inflammatory properties.The synthesis of Adathodai leaf extract, the creation of a stable nanoemulsion, and its integration into a gel base to create the nanoemulgel are the main topics of this work.In order to guarantee successful therapeutic outcomes, other goals include characterising the formulation for factors including particle size, viscosity, pH, and spreadability and assessing its in vitro antiinflammatory capability using HRBC membrane stabilisation and protein denaturation techniques.

MORPHOLOGY

Justicia adhatoda commonly known as Vasaka or Adulsa, is a evergreen shrub to the family Acanthaceae. Native to India, it is widely distributed in lower Himalayan ranges. The plant grows up to three meter in height and has opposite branches with broad, lanceolate leaves measuring 10–15 cm in length. The leaves are light green on the upper surface and darker beneath, with a short petiole. It have white flowers with purple markings on lower lip and produces small, clavate capsules containing four round seeds. Justicia adhatoda is highly used in Ayurveda for its therapeutic uses in the treatment of respiratory diseases such as asthma and chronic bronchitis. Vasicine is principle alkaloid present in the plant, has demonstrated significant anti-inflammatory activity, contributing to its pharmacological importance.

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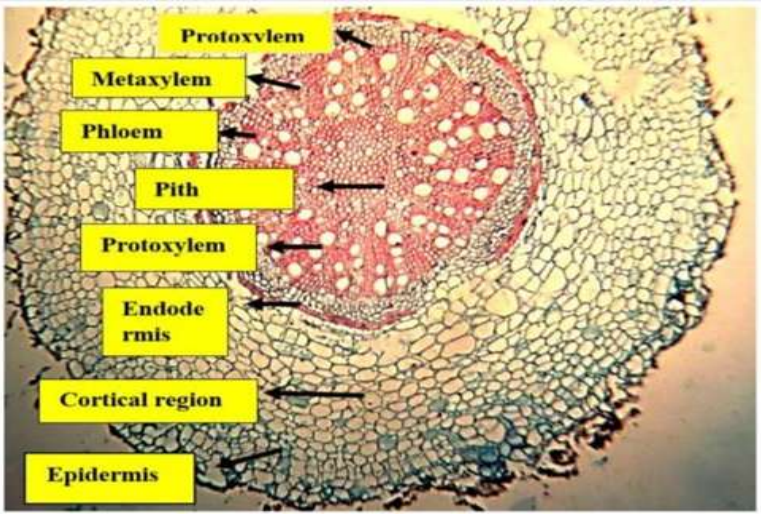
CLASSIFICATION:
Kingdom: Plantae
Class: Magnoliopsida
Order: Lamiales
Family: Acanthaceae
Genus: Justicia
Species: adhatoda

PHYTOCONSTITUENTS

Sen and Ghose (1924) isolated an alkaloid named vasicine (C11H12N2O) from Adhatoda vasica Nees. The leaves contain about 0.2–2.0% vasicine, often in combination with adhatodic acid. higher in March–April and vasicine content higher in June–September.

The phenol and flavonoid contents are found in plants grown in soil.quinazoline alkaloids such as vasicoline, adhatodine, vasicolinone, anisotine, vasicinone, vasicol, vasicinolone, adhavasinone, and adhavasicinone isolated from different parts of the plant. The major alkaloid, vasicine, occurs as white needle-shaped crystals with a melting point of 182°C, is soluble in alcohol, and slightly soluble in cold water. It forms crystalline salts with mineral acids and behaves as a tertiary base. Seasonal variation affects alkaloid composition, with minor alkaloids



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PHYTOCHEMICAL ANALYSIS

Ethanolic and chloroform extracts were assessed for contains of primary and secondary metabolites are steroids, tannins, saponins, anthocyanins, coumarins, alkaloids, proteins, amino acids, diterpenes, phytosterols, phenols, leucoanthocyanins, cardiac glycosides, and flavonoids of Adhatoda vasica. Only alkaloids were recovered from the ethanolic extracts while steroids are separated from the chloroform. Other phytochemicals such as flavonoids, saponins, and terpenoids were found in both extracts supporting their use in the protection for the body from degenerative illnesses. Tannins were more efficiently extracted using chloroform while cardiac glycosides were detected in the ethanolic extracts only. The ethanolic extract of the leaves showed more antibacterial activity than the chloroform extracts and more inhibition against the common pathogens E. coli , S. aureus, and S. pyogenes. This indicates an increased ability of the ethanolic extract to phytochemicals of antimicrobial properties and more so A. vasica has the ability as a natural source of antibacterial activity.

THERAPEUTICAL APPLICATIONS:

Since Adhatoda vasica has been the most repeatedly used drug in Ayurvedic medicine for more than 2000 years, it finds its place as an official drug in the Indian Pharmacopoeia. It is also included among the medicinal plants recommended by WHO as useful in primary healthcare. The plant contains active principles like alkaloids (vasicine and vasicinone), With the advance in time, the pharmacological studies demonstrated that a vasica exhibits expectorant, bronchodilator, anti-allergic, anti-asthmatic, anti-tubercular, radioprotective, hepatoprotective, insecticidal, anti-mutagenic, anti-bacterial, adjusting anti-rheumatic, anti-typhoid, renal protective, and anti-inflammatory activities. The chief alkaloid vasicine exerts highly significant bronchodilatory, uterotonic, and anti-inflammatory effects comparable to hydrocortisone. Several reports are available regarding anti-HIV-protease activity with liver and kidney supportive activity through an antioxidant mechanism. Thus, Adhatoda vasica is an important medicinal plant for the development of natural therapeutic agents

II. CONCLUSION

Justicia adhatoda is a medicinal plant contains anti-inflammatory activity due to its alkaloid content, particularly vasicine, flavonoids, tannins, and other phenolic compounds. Extracts of the leaves have significant inhibition of protein denaturation and membrane lysis in invitro models and supporting their role in stabilizing biological membranes and reducing inflammation. Justicia adhatoda extracts into suitable topical or transdermal formulations and other advanced delivery systems, can enhance local penetration, sustain drug release, and minimize systemic side evaluation methods like HRBC membrane stabilization and protein denaturation assays, Justicia adhatoda-based preparations emerge as promising candidates for safe, effective management of inflammatory conditions and as a foundation for future phytopharmaceutical development.

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