



A review on phytochemical, biological and pharmacological properties of *Andrographis echioides*.

M.V.JYOTHI KUMAR¹, CH. APPA RAO^{1*}.

¹ Department of Biotechnology, Sri Venkateswara University, Tirupati, AP, India

^{1*} Department of Biochemistry, Sri Venkateswara University, Tirupati, AP, India

Abstract:

Andrographis echioides (Acanthaceae) is widely distributed in South Asian nations and is recognized for its potent biological properties in the Indian Materia Medica. phytochemical analysis reveals this plant rich in flavonoids, phenols, terpenoids, steroids, tannins, and saponins. It consist of high bioactive compounds profile which are responsible for various biological properties like anti-inflammatory, anti-bacterial, hepatoprotective, antioxidant, antidiuretic, and antidiabetic effects. *Andrographis echioides* is a high potent medicinal property plant used as remedy for various diseases in traditional system of medicine.

Key Words: *Andrographis echioides*, phytochemical, antioxidant, antimicrobial.

Introduction:

Medicinal plants plays a crucial role in traditional herbal medicine to treat various diseases and disorders in the Global scenario. Globally there are 80,000 plant species that have been recognized and utilized as medicines (1). In developing countries reports states that around 75-80% of people and 25% of people in developed countries utilizes traditional system of medicine for the first line of medication (2, 3). Medicinal plant derived bioactive compounds utilized as a potent source for alternative medicine to treat various health conditions (4).

Andrographis echioides (L.) Nees commonly called as “False water willow”. It is an erect herb widely distributed in India and Sri Lanka (5). In traditional system of medicine this herb is used as folk medicine for the treatment of

dysentery, swellings, jaundice. It has hepato-protective and antioxidant properties (6). Chemical constituents in whole plant of *Andrographis echioides* revealed the presence of various flavonoids suggesting that the plant is rich source of flavonoid constituents (7).

Taxonomical Hierarchy:

Kingdom : Plantae

Division : Magnoliophyta

Class : Magnoliopsida

Order : Lamiales

Family : Acanthace

Genus : *Andrographis*

Species : *Andrographis echioides*

Morphological Characteristic features:

Andrographis echioides (L) Nees is an herb with branchlets up to 50 cms in length. Leaves are oblanceolate having granular hairs on both the abaxial and adaxial surfaces. Stems having hairs on its surface and has a slightly quadrangular in shape. The plant has a raceme type of inflorescence; seed are ovoid and yellow in colour. The morphological Characteristic features are presented in Figure 1.

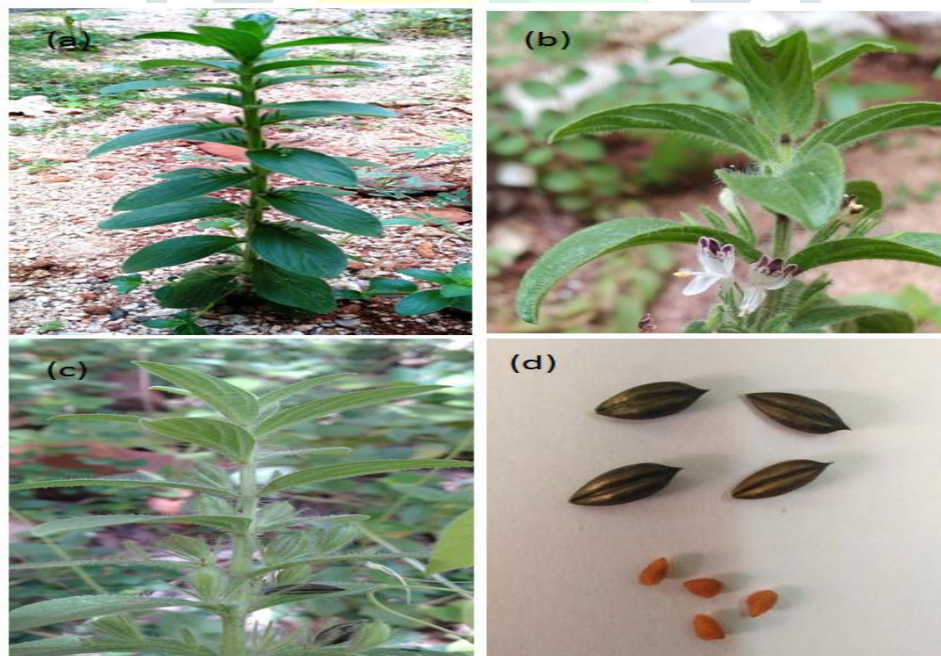


Figure 1. *Andrographis echioides* and its different parts. (a) Whole part, (b) Inflorescence
(c) Seed pod arrangement (d) Matured seed pod and Seeds

Pharmacological properties of *Andrographis echioides*:

Andrographis echioides is rich in phytochemical compounds. Isolation of phytoconstituents and bioactive elements by using different isolation procedures, from various aerial parts, such as the leaves, stem, and roots, has been reported for their pharmacological properties. Govindachari *et al* (1965) isolated echioidinin a new flavones and echioidin its glucoside from *Andrographis echioides*. Spectral, degradative, and synthetic data support that identification of echioidinin as 5,2'-dihydroxy-7-methoxyflavone and echioidin as 5-hydroxy-2'-β-D-glucosidoxy-7-methoxyflavone as echioidinin-2'-β-D-glucoside (8,9). Jayaprakasam *et al* (1999) isolated dihydroechioidinin a new flavones, based on structural and chemical evidence it was identified to be 2(S)-5, 2'-dihydroxy-7-methoxyflavanone (10). The phytoconstituents like alkaloids, flavonoids, triterpenoids, glycosides, steroids, phenols, phenols, phytosterols, amino acids and saponins are responsible for biological activity in a Synergistic manner (11).

Antrimicrobial activity and Antifungal activity of *Andrographis echioides*:

Antrimicrobial activity of leaf and stem of different solvent extractions like petroleum ether, chloroform, acetone, and methanol of *Andrographis echioides* were examined against different pathogens like *Enterococcus faecalis*, *Streptococcus pyogenes*, *Klebsiella pneumonia*, *Proteus vulgaris*. Methanolic extract shows potent antibacterial activity against all solvents, among all pathogens, *Streptococcus pyogenes* showed more sensitivity. The different solvent extractions against *Candida albicans*, *Aspergillus flavus*. The chloroform extract of stem and leaf of *Andrographis echioides* showed significant antifungal activity on *Aspergillus flavus* and *Candida albicans* (12).

Anti-inflammatory, analgesic and Antipyretic activity of *Andrographis echioides*:

S.K. Basu *et al* (2009) reported that, different solvent extracts like ether, chloroform, and ethyl acetate from *Andrographis echioides* were showed significant anti-inflammatory, analgesic and antipyretic properties against experimental animal models. The carrageenan induced paw oedema, cotton pellet granuloma in rats, writhing nociception in mice, and yeast-induced hyperpyrexia in rats were all treated with doses of 200-400 mg kg⁻¹ of different extracts. At five hours after carrageenan injection, all drugs decreased paw oedema in contrast to the control group. The reduction of paw oedema and cotton-pellet granuloma was less effective with chloroform extract than with phenylbutazone (6).

Hepatoprotective and Antioxidant activity of *Andrographis echioides*:

K. Kavitha *et al* (2009) reported that, methanolic extract of *Andrographis echioides* at dosage of 200 and 400 mg kg⁻¹, p.o/day results a significant hepatoprotective and antioxidant activity. The active biological constituents present in extract responsible for alter serum marker enzymes and antioxidant levels to near normal in acetaminophen induced Hepatotoxicity in Wistar albino rats (13). The total oligomeric flavonoid fraction of *Andrographis echioides* consist of having high antioxidant compounds for management of oxidative stress related complications in streptozotocin induced diabetic rats (14).

Anti-ulcer activity of *Andrographis echioides*:

Ramasubramania Raja *et al* (2014) reported that, ethanolic extract of leaves of *Andrographis echioides* showing more potential more anti-ulcer property in gastric lesions induced by pylorus ligation in male Albino rats (15).

Conclusion:

Andrographis echioides is high potent medicinal plant possesses wide range of bioactive phyto-constituents which are responsible for treatment and management of various diseases and disorders. Hence this plant can be used for various pharmacological drug developments for human health care in natural system of medicine.

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