

**ASYSTASIA GANGETICA: REVIEW ON MULTIPOTENTIAL APPLICATION**

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ABSTRACT

Asystasia gangetica (L.)T. also known as “Chinese violet” is a rapidly growing straggling herb mainly distributed in India. In traditional system of medicine, the plant is used for various ailments and diseases. The present review article overview the ethanomedicinal, phytochemical and pharmacological investigation carried out on the plant.

KEYWORDS: *Asystasia gangetica*, Current status, Medicinal applications

INTRODUCTION

The value of medicinal plants to the human being is very well proven, according to WHO about 70 to 80% of the people worldwide accept traditional herbal healthcare systems of medicines. Present review acknowledges the value of medicinal plant as sources of new compounds of therapeutics value and lead compound in development of drugs which has to explore. It is need of hour to screen medicinal plants for bioactive principles as basis of further research studies

Asystasia gangetica (L.)T. also known as “Chinese violet” is a rapidly growing straggling herb mainly distributed in India, grows to 10m height at an altitude 300m¹. The leaves are green, oval shaped with rounded base, very slightly sawedged and smooth². Flowers are pale purple blue to violet or lime white in colour, capsules are 2.5-3.5cm long with wide base and seeds are 5mm in diameter³.

PLANT PROFILE⁴⁻¹⁰

Figure 1: Plant of *Asystasia gangetica*

Table1: Plant profile

Kingdom	Plantae – Plants
Subkingdom	Tracheobionta – Vascular plants
Superdivision	Spermatophyta – Seed plants
Division	Magnoliophyta – Flowering plants
Class	Magnoliopsida – Dicotyledons
Subclass	Asteridae
Order	Scrophulariales
Family	Acanthaceae – Acanthus family
Genus	<i>Asystasia</i> Blume – asystasia
Species	<i>Asystasia gangetica</i> (L.) T. Anderson – Chinese violet

ETHNO MEDICINAL AND TRADITIONAL USE

The plant *Asystasia gangetica* has been used medicinally from ancient time in Babungo for treating different ailments¹¹. Rural people in Sivagangai district of Tamil Nadu, Peoples of Southern part of India used entire plant juice for rheumatism¹². Tribal people of Marudhamalai hills, Coimbatore Tamil Nadu generally apply root paste for skin allergies¹³. In Kwazulu-Natal, South Africa people use *Asystasia gangetica* as vegetable. Traditionally plant juice used for anthelmintic activity, in swelling, rheumatism also in gonorrhoea and ear disease¹⁴.

It is a folk remedy for treating diabetes mellitus in parts of South India. Nigerian people claimed to be leaves of *Asystasia gangetica* are highly effective in local treatment of asthma¹⁵.

PHYTOCHEMICAL PROPERTIES

Asystasia gangetica contains carbohydrates, proteins, alkaloids, tannins, steroidal aglycans, saponins, flavonoides, and triterpenoides²⁷, the plant also contain minerals like calcium, phosphorus, sodium, manganese, copper, zinc, magnesium, iron¹⁶.

Biflavon glycoside from flowers of *Asystasia gangetica* have been isolated, which was characterized as apigenin 7-O-glucosyl (3'→6'') luteolin 7''-O-glucoside¹⁷. A 5,11-epoxymegastigmane glucoside (asysgangoside) was isolated from aerial part of *Asystasia gangetica* together with known compounds, salidroside, benzyl beta-D- glucopyranoside, (6S,9R)-roseoside, ajugol, apigenin 7-O-neohesperidoside¹⁸. Aquous extract of stem and leaves contain cardiac glycoside and methanolic extract shown presence of Anthraquinones²⁷.

PHARMACOLOGICAL AND CLINICAL STUDIES

Asystasia gangetica contains substances like flavonoids and others, which makes plant useful in various ailments or disease.

Analgesic And Anti-Inflammatory Activity

The anti-inflammatory activity of methanolic extract of *Asysatasia gangetica* (L.)T. Andas. leaves (200 and 400 mg/kg. p.o.) in albino wistar rats was assessed by using various types of in-vivo pharmacological screening methods such as Carageenan induced paw oedema and Cotton pellet induced granuloma technique. Methanolic extract (400mg/kg) of *Asysatasia gangetica* L. significantly

decreased the paw oedema from the second hour of carageenan induced paw oedema method and a significant decrease in granuloma formation was observed in the cotton pellet technique. However, the significant decrease in the paw oedema was also observed even at the dose of 200mg/kg of methanolic extract of *Asystasia gangetica* L. after four hours carageenan induction. The anti-inflammatory activity of the methanolic extract may be due to the inhibition of prostaglandin synthesis and by the stabilization of the lysosomal membrane as evidenced from its efficacy¹⁹.

The aqueous stem and leaf extract of *Asystasia gangetica* (25-200 mg/kg) significantly ($p < 0.05$) reduced the number of writhes in the acetic acid induced writhing test. At 100 mg/kg, it produced an increase in pain threshold comparable to that produced by morphine (10 mg/kg) in the tail flick test and peak analgesia at 200 mg/kg in the hot plate test. The extract (25-200 mg/kg) also produced significant ($p < 0.05$) inhibition of oedema comparable to indomethacin (10 mg/kg) in the carrageenan induced paw oedema model. The extract (200 mg/kg) produced a significant inhibitory effect ($p < 0.05$) comparable to that produced by 1 mg/kg dexamethasone in the xylene induced mouse ear oedema model²⁰.

Hypoglycemic And Hypolipidemic Activity

The potential hypoglycemic and hypolipidemic effect of *Asystasia gangetica* in alloxan induced diabetes mellitus was investigated. Diabetes was induced by alloxan (150 mg/kg i.p) in to rats. Ethanolic extract of leaves of *Asystasia gangetica* was administered to alloxan induced diabetic rats. Glibenclamide used as a reference standard. Blood glucose, triglycerides, cholesterol, HDL-cholesterol, LDL-cholesterol and total proteins were estimated from the serum by using standard kits. All groups show significant decreased in the biochemical parameters after administration of ethanolic extract of leaves of *Asystasia gangetica*. From this study it has been concluded that the ethanolic extracts of leaves of *Asystasia gangetica* having good hypoglycemic and hypolipidemic effect²¹.

Antioxidant Activity

In vivo studies reveals that levels of the protective antioxidant enzymes like SOD, CAT and GSH were increased along with decrease in the LPO levels provide a scientific evidence for antioxidant potential of *Asystasia gangetica*²². *In vitro* studies indicate that DPPH radical scavenging of methanolic extract has IC₅₀ value 179.67 µg/ml. The methanolic extract showed concentration dependant α-glucosidase (IC₅₀ - 325µg/ml) and α-amylase (IC₅₀ -3.75µg/ml) inhibitory activity. The *in vitro* studies clearly indicate that the methanol extract of leaves of *Asystasia gangetica* has significant *in vitro* antioxidant and α-glucosidase and α-amylase enzymes inhibitory activity²³.

Antiasthmatic Activity

The hexane, ethyl acetate and methanol extracts of the leaves of *Asystasia gangetica*, obtained by successive soxhlet extraction. The extracts relaxed histamine-precontracted tracheal strips in the following degree of potency ethylacetate extract > hexane extract = methanol extract. The extracts also exhibited anti-inflammatory activity in the order of magnitude-methanol extract > hexane extract > ethylacetate extract. Acute toxicity test estimated an i.p. LD₅₀ of 2150 mg/kg in mice for methanol extract. The study justified the use of the leaf of *Asystasia gangetica* in the management of asthma²⁴⁻²⁶.

Antimicrobial And Antifungal Activity

The hexane, ethylacetate and methanol extracts obtained from the whole plant of *Asystasia gangetica* were evaluated *in-vitro* to determine inhibition of human pathogenic microorganisms made up of six bacteria and six fungi. The crude extracts inhibited the growth of twelve test organisms to different degrees. All the bacteria strains *Salmonella typhi* (UCH4801), *Escherichia coli* (UCH 00260), *Pseudomonas aeruginosa* (UCH 1102) and *Klebsiellae pneumoniae* (UCH 2894) belongs to the gram-negative and *Bacillus subtilis* (UCH 74230) while *Staphylococcus aureus* (UCH 2473) belongs to the gram-positive were sensitive to all the extracts at concentration ranging from 50 to 200mg/ml using the agar diffusion pour plate method. The inhibition of these test organisms were concentration dependent, activity being higher at higher concentrations of all the three extracts. The extracts showed higher antifungal properties on *Candida albicans*, *Penicillium notatum*, *Tricophyton rubrum* and *Epidermophyton floccosum* with activity comparable to that of the reference drug, Tioconazole²⁷.

CONCLUSION

The present paper reveals the multi-potential application of *Asystasia gangetica* as medicinal plant. The bioactive components responsible for the activities are not precisely known but it may be one or more of the phytoconstituents established to be present in various parts of plant. However it is imperative to explore unexploited potential of this plant especially as novel antiasthmatic agent.

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