



Medical importance of *Ipomoea Quamoclit* - A Systematic Review

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ABSTRACT

Ipomoea quamoclit is originally American plant and reached Europe by the 1550s. It is commonly known as cypress vine, cardinal creeper, is a species of vine in the family convolvulaceae and the vines are recorded from both Europe and India in the 1500s and were taken to both places for its medical uses. It is a medicinal plant traditionally used to treat haemorrhoid's, ulcers, diabetes and cancer. According to ayurveda, Cypress Vine plants are used to treat various ailments and are also an important ingredient in the preparation of some medicinal products. However, they are widely grown throughout the tropics as an ornamental plant for their attractive flowers and exotic leaves. This ornamental plant grows as an annual plant that thrives only in tropical and subtropical regions. In non-tropical areas, these are grown as seasonal plants.

Ipomoea quamoclit L is a less studied medicinal plant which is used as folk medicine around the world for illness. The plant is considered cooling and purgative; used in chest pain, pounded leaves are used as remedy for bleeding piles and carbuncles. It is belonging to convolvulaceae family is an annual, herbaceous plant, commonly known as mayil manikkam, akasamulla, kunjolata, tarulata, kamalata, getphul in India and distributed throughout the tropical areas of the world. It is one of the commonly cultivated members of the convolvulaceae, and arguably the most strikingly beautiful morning glory in the horticultural trade. These scarlet flowered climbers form a delicate, lacy mass of pinnately divided leaves during the warm months in temperature regions, and year-round in tropical areas. Various studies have confirmed that *Ipomoea quamoclit* exhibit a vast range of bioactivities like antioxidant activity, antimicrobial activity, anticancer activity, antidiabetic activity as well as insecticidal activity.

INTRODUCTION

Medicinal plants have been the subjects of man's curiosity and purpose since time immemorial. Pharmacognosy is the scientific discipline for the description and recognition of medicinal plants and plant products¹. Herbal medicine has become a popular form of healthcare; even though several differences exist between herbal and conventional pharmacological treatments, herbal medicine needs to be tested for efficacy using conventional trial methodology and several specific herbal extracts have been demonstrated to be efficacious for specific conditions.² Herbs and

related products are commonly used by patients who also seek conventional health care. All physicians, regardless of specialty or interest, care for patients who use products that are neither prescribed nor recommended. Some herbs have been extensively studied, but little is known about others^{3,4}. Medicinal plants are presently in demand and their acceptance is increasing progressively. Herbals especially medicinal herbs have constantly acted as an overall indicator of ecosystem health⁵.

Convolvulaceae is one of the major families of flowering plants known as morning glory family with approximately 2000 species and of 5 genera from all over the world. The genus



Fig. : *Ipomoea quamoclit*

Ipomoea comprises the large number of species with in the convolvulaceae. The plants of convolvulaceae family contains the pharmacologically active compounds and quamoclit leaves found several medicinal uses such as antioxidant, anticancer, anti-inflammatory and it is traditionally used as an antidote to snake bites. In the present review of pharmacological actions of plant *Ipomoea quamoclit* has been discussed.

TAXONOMY

Scientific classification.

Domain	-Eukaryota
Kingdom	-Plantae
Phylum	-Spermatophyta
Subphylum	-Angiospermae
Class	-Dicotyledonae
Order	-Solanales
Family	-Convolvulaceae
Genus	-Ipomoea
Species	-Ipomoea quamoclit ⁶

VERNACULAR NAMES

Scientific Name	- <i>Ipomoea quamoclit</i> L
Common Name	-Cypress vine
Kannada	-kaamana balli, Kempu mole, Kaamalate
Tamil	-Mayilmannikkam
Malayalam	-Akasha-mulla

Other scientific Names

- Convolvulus Pennatifolius salisb
- Convolvulus pennatus Desr
- Convolvulus quamoclit (L) spreng
- Quamoclit pennata (RAF) DESV
- Quamoclit pinnata
- Quamoclit vulgaris choisy

PREPARATION OF IPOMOEA QUAMOCLIT LEAF EXTRACT

The collected *Ipomoea quamoclit* L. leaves were washed with sterilized distilled water to remove the dust particles. The clean leaves were shade dried and then crushed well into a powder form using agate mortar. About 10 g of powder was dispersed in 100 ml of distilled water, then the solution was heated to 60°C in the water bath for 15 min. Finally, the extract was filtered, collected and stored at 5°C under dark until further use⁷.

BOTANICAL DESCRIPTION

Ipomoea quamoclit is an annual. Which is an annual, herbaceous; twinning vine belongs to the family Convolvulaceae. It is commonly known as cypress vine, star glory, cardinal creeper, Indian pink, hummingbird vine and cupid's flower. *Ipomoea quamoclit* is one of the most commonly seen plant throughout the tropics in and around of the living area from northern south America to Mexico. In India, it is called mayil manikkam, akasamulla, kunjatala, tarulata, kamalata, getphul.⁸ Development of stem vasculature of this twining vine may be separated in to five oncogenic stages, namely; the bicollateral bundle stage, the cambium-like meristem stage, the normal cambial stage, the anomalous cambial stage and the supernumerary cambial stage. The primary vasculature of the stem consists of bicollateral bundles. Within these bundles the external protophloem becomes separated from the protoxylem and internal phloem by a cambium-like meristem that produces cylinders of external meta phloem and metaxylem.⁹ The stem is a slender, twining and glabrous vine; size-4 m or more, light green in colour with agreeable odour and slight bitter taste, fractured surface showing fibrous nature. Root is cylindrical and slightly tapering, branched and shows fibrous fracture, 2-5 cm long and 2-4 mm thickness. The inner wood is yellowish brown in colour.¹⁰

MICROSCOPIC CHARACTERS

Transverse section of stem The stem is circular in cross-sectional view with broad, thick ridges and shallow wide furrows. The vascular cylinder is thin and the pith is wide. The stem is 2.5 mm in diameter. The stem consists of a thick epidermis measuring about 20µm in radial plane. The cortex is narrow, homogeneous and parenchymatous. Along the ridges, the cells are collenchymatous. The circular, fairly wide secretory canals are distributed in the cortex along the circumference and are about 50µm in diameter. It is surrounded by a layer of epithelial cells,

which are not distinct from the neighbouring cells. The vascular cylinder is closed. Uniformly thin and the initial stage of secondary growth. It consists of a thin continuous zone of phloem. On the outer surface of the phloem cylinder is a thin discontinuous layer of sclerenchymatous cells.

Transverse section of root the root shows well-developed anomalous secondary growth and has a thin periderm and a narrow cortex. Since the cortex is parenchymatous, it breaks separating the vascular cylinder. The secondary xylem is broken into four major fan shaped radial segments, each of which is further cleaved into smaller lobes. Between the major lobes, broad radial files of parenchymatous cells form the cambium. In other regions, opposite to the xylem lobes, the cambium produces secondary phloem.¹⁰

PHYTOCONSTITUENTS

Ipomoea quamoclit consist chemical constituents, such as alkaloids, flavonoids, glycosides, saponins, carbohydrates, terpenoids, and tannins¹¹. The whole plant powder found to possess phytoconstituents like alkaloids, carbohydrates, saponins, phenolic compounds, tannins, phyto sterols, amino acids, protiens. *Ipomoea* is able to synthesize a large number of alkaloids where as others, especially *Ipomoea quamoclit*, *ipomoea coccinea* are poor synthesizers with only a few compounds however, these metabolites apparently chemotaxonomic markers of this intragenic taxon in general. they represent either ester of (-) platycerine (all together 48 ipangulines and further esters including result of pervious study) or ester of (-) trachelanthamide¹¹.

FOLK USE:-

Different parts of *ipomoea quamoclit* as flowers, leaf and fruits are used in siddha medicine where the decoction of leaves and stems are used to treat fever, diabetics. It is used for snake bites and bloody cough, purgative, antidiabetic, antibacterial, antifungal, anti-oxidant activities¹².

PHARMACOLOGICAL ACTIVITIES:-

Anticancer activity: -Ho *et al.* The cytotoxic studies indicate that *Ipomoea quamoclit* inhibits Caco-2 (colon cancer) cell viability which is dose dependent. The IC50 values estimated were

>100µg/ml for ethanolic plant extract. The ethanolic extract of *Ipomoea quamoclit* has significant cytotoxic activity. anti-proliferative effect of the dichloromethane, methanol, hexane and ethyl acetate extracts of leaves of *Ipomoea quamoclit* on HeLa (cervix adenocarcinoma), MCF-7 (breast adenocarcinoma), CNE-1 (nasopharyngeal carcinoma), 3T3 (normal mouse fibroblast) and HT-29 (colorectal adenocarcinoma) cell lines. Among different solvent, the methanol extract of *Ipomoea quamoclit* leaf against the tested cell lines was shown to possess the highest anti-proliferative activity. The crude aqueous extracts of leaves of *Ipomoea quamoclit* studied had significant cytotoxic property on a cell line (HEP G2) and exhibited remarkable inhibitory effect on A549 cell line^{13,14}.

Antidiabetic activity: - Reddy *et al.* evaluated antidiabetic activity of the hydroalcoholic extract of whole plant by streptozotocin induced diabetic rats. Thirty days administration of hydroalcoholic extract of *Ipomoea quamoclit* whole plant exhibited a significant depletion in blood glucose levels¹⁵.

Insecticidal activity: -Prodhon *et al.* Reported that the plant

extracts are one of the best alternatives of chemically synthesized insecticides and can protect the flora as well as the global environments. Prodhon *et al.* (2012) investigated effect of chloroform extract of *Ipomoea quamoclit* whole plant on salivary gland chromosomes of house fly (*Musca domestica* L.). Dose mortality test result showed the intensity of activity of *I. quamoclit* was 911.83 ppm. The test results showed significant effects on salivary gland chromosomes¹⁶.

Antimicrobial activity: -Moreno *et al.* reported that the *Ipomoea quamoclit* possess antimicrobial properties. The hexane extract of *Ipomoea quamoclit* stems inhibited the bacterial growth of *Salmonella enteritidis*, *Bacillus cereus*, *Escherichia coli*, and *Staphylococcus aureus*, whereas their methanolic extract only affected the growth of *Escherichia coli*. The hexane extract of *Ipomoea quamoclit* leaves inhibited the growth of *Bacillus cereus*. Their results cast *Ipomoea quamoclit* as a likely source of bioactive molecules capable of inhibit the growth of pathogenic bacteria. Moin *et al.*¹⁷, evaluated antimicrobial activity of cationic protein from mature seeds of *Ipomoea quamoclit* against several pathogenic bacterial and fungal strains¹⁸.

CONCLUSION

In the present study biological activities *Ipomoea quamoclit*, it exhibits different bio activities like antimicrobial activity, antioxidant activity, antidiabetic activity as well as insecticidal activity. From this study it is concluded that *Ipomoea quamoclit* is a source of biologically active compounds and have various biological activities, hence, it is encouraging to find its new therapeutic. Due to various promising biological activities and ethnomedical importance, further studied should be carried out on drug development from plant extracts and constituents of the *Ipomoea quamoclit*.

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