

Review Article

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## Review on Pharmacological Properties of Glory Lily (*Gloriosa superba* Linn.): An Endangered Medicinal Plant

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### ABSTRACT

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Glory lily is an important medicinal plant which comes under endangered species among the medicinal plants. In Southern India it is called as glory lily and climbing lily-in English. Seeds and tubers contain valuable alkaloids such as colchine and colchicoside, which are having ethnobotanical and pharmacological properties to cure various diseases. The tuber is used as an antidote for snake bites, gout, rheumatism, bruises, sprains, colic and chronic ulcers, haemorrhoids, cancer, impotence, nocturnal seminal emission, leprosy and also for including labour pains and abortions. *Gloriosa superba* also used in wounds, skin related problems, fever, inflammation, piles, blood disorders, uterine contractions, general body toner, poisoning. Roots are acrid, anthelmintic, antipyretic, bitter, digestive, expectorant, highly poisonous and promoting expulsion of the placenta. Root paste is effective against paralysis, rheumatism, snake bite and insect bites. Hence in this article an attempt has been made to gather the more information regarding pharmacological properties of glory lily.

### Introduction

*Gloriosa superba* Linn. is an important medicinal plant belongs to the family colchicaceae or liliaceae. In English it is commonly called as glory lily, in Kannada gowri hoo, agnishike/ akkathangiballi while, in Hindi it is called karihari. *Gloriosa* is a

native plant of Tropical Africa and it is found growing throughout tropical India, from the North-west Himalaya to Assam and the Deccan peninsula. In Karnataka, it is commonly found growing all along the Western Ghats and it is considered as the state flower of Tamil Nadu. All parts of the plant especially the tubers & seeds contain

alkaloids such as colchicine and Gloriosine (Trease and Evans, 1983). Tubers and seeds of *Gloriosa superba* are an expensive export commodity. In the Indian systems of medicine, the tubers are used as tonic, antiperiodic, antihelmintic and also against snake bites (Gupta *et al.*, 2005). Colchicine & Gloriosine are two commonly used phytochemicals for treatment of gout & rheumatism. Different parts of the plant have wide variety of uses especially within traditional medicine practiced in tropical Africa and Asia. The tuber is used traditionally for the treatment of bruises and sprains, colic, chronic ulcers, haemorrhoids, cancer, impotence, nocturnal seminal emission, and leprosy and also for including labour pains and abortions (Kala *et al.*, 2004). *Gloriosa superba* also used in wounds, skin related problems, fever, inflammation, piles, blood disorders, uterine contractions, general body toner, poisoning (Haroon *et al.*, 2008). Glory lily gained the importance in medicine in recent years & is indicated promising drug for the production of colchicine on commercial scale.

### **Plant Profile and Classification**

*G. superba* is a perennial herbaceous vine growing 3.5 to 6.0 meters in length. It bears V or L-shaped, finger-like tubers that are pure white when young, becoming brown with age. It is a climbing herb, sometimes erect up to 6 m long, bearing pointed, dark green, glossy leaves, each equipped with a tendril by means of which it clings onto other plants. Leaves occur in whorls of 3 to 4, opposite or alternate, simple, sessile, ovate to lanceolate ranging from 6 to 20 cm in length and 1.5 to 4 cm wide. The attractive flowers are borne on long stalks and have six erect petals ranging in colour from bright yellow to bicoloured, red and yellow or purple and yellow. The fruits are capsules that split open to release several smooth red seeds with a spongy test. (Maroyi *et al.*, 2011)

### **Habitat**

*Gloriosa* is a native of tropical Asia and Africa. The genus derives its name from the Latin word gloriosus, referring to the flowers. It is found growing throughout tropical India, from the North -West Himalayas to Assam and the Deccan peninsula. In Karnataka, it is commonly found growing all along the Western Ghats.

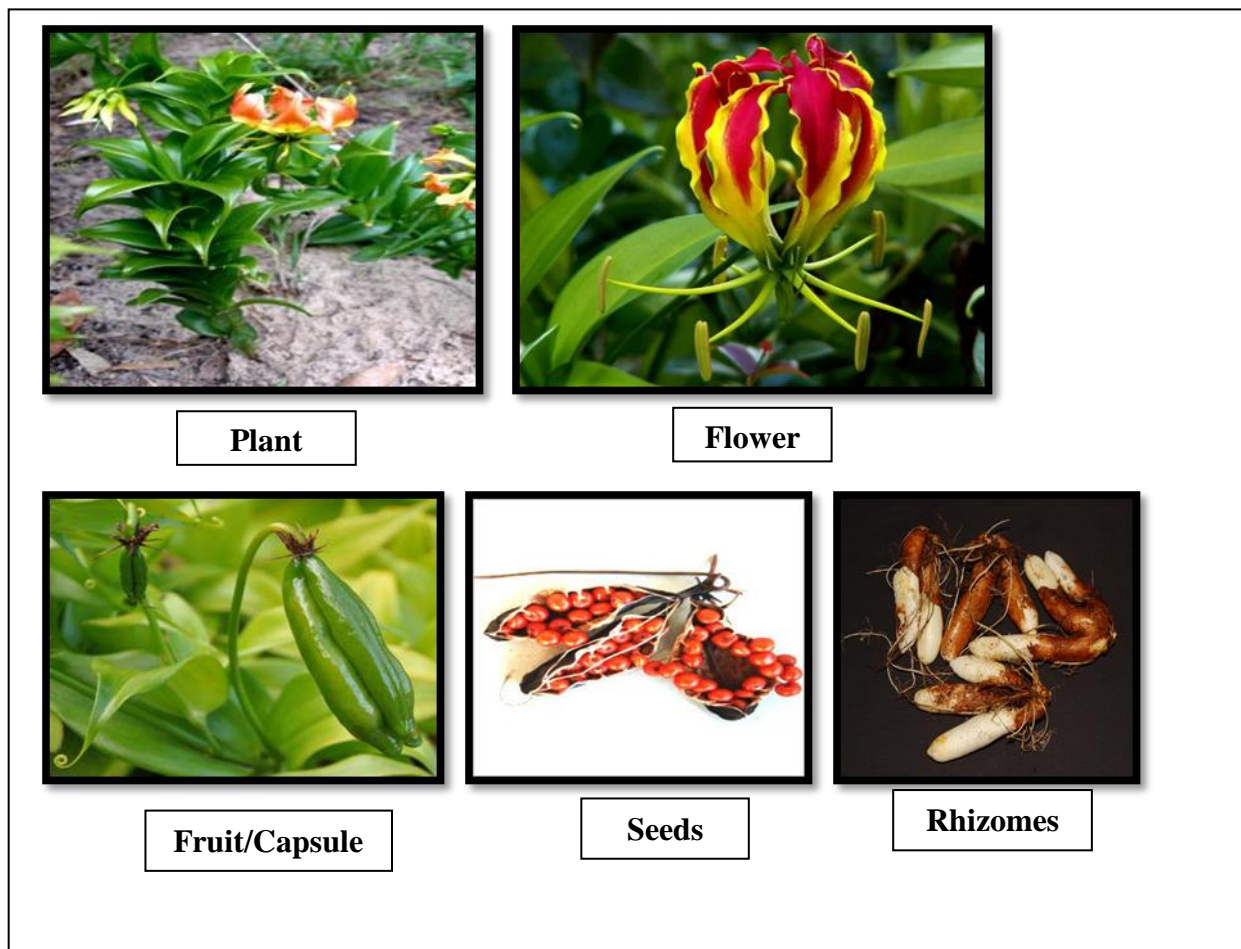
It is also found growing in Madagascar, Srilanka, Indo-China and on the adjacent island (Faroogi and Sreeramu, 2001). The plant grows in sandy-loam soil in the mixed deciduous forests in sunny positions. It is very tolerant of nutrient-poor soils. It occurs in thickets, forest edges and boundaries of cultivated areas in warm countries up to a height of 2530 m. It is also widely grown as an ornamental plant in cool temperate countries under glass or in conservatories. (Acharya, 2006)

### **Chemical Constitutes**

Studies reveal that all parts of the plant, especially the tubers are extremely toxic due to the presence of a highly active alkaloid, Colchicine. The species also contains another toxic alkaloid, Gloriosine. Other compounds such as lumicolchicine, 3-demethyl-N-deformyl-N-deacetylcolchicine, 3-demethylcolchicine, N-formyldeacetyl colchicine have been isolated from the plant (Jain and Suryavanshi, 2010)

### **Traditional Uses**

Root tuber with sesamum oil will reduce the pain in arthritis affected joints (Abhishek *et al.*, 2011). Traditionally, the rural women prefer *G. superba* plant for gynecological disorders like abortion, menstrual trouble, conception disorders, sterility, delivery problems *etc.*, rather than modern medicines.



The Gond tribe of Madhya Pradesh in case of induced abortion they grind tuber of the plant mixed with ghee and used orally (Tiwari *et al.*, 2003). The tribes of Deogarh district used *G. superba* against piles. It is ethno-medicinally very important to the tribal's.

The people of this region derive immense benefit by using herbal medicines for their primary health care. The roots and rhizomes are used in traditional system of medicine. Rhizome is anticancerous, oxytocic, antimalarial, stomachic, purgative, cholagogue, anthelmintic, alterative, febrifuge and antileprotic. Leaf is antiasthmatic and antiinflammatory. Root shows antigonorrhoeic and antibiotic activity (Sahu, 2010)

### Pharmacological properties

#### Anti-anxiety

Phytochemical screening of ethanolic and aqueous extracts showed presence of carbohydrates, alkaloids and saponins.

Amongst various extracts ethanolic extract of *Gloriosa superba* Linn.

significantly increased mean number of entries and meantime spent by mice in open arms of elevated plus maze apparatus at the dose of 300 mg/kg with respect to control, thereby producing anti-anxiety activity (Sundaraganapathy *et al.*, 2013).

### **Anti-bacterial property**

Both Gram positive and Gram negative bacteria growth was inhibited by the extracts. It may be due to the reason that the tubers have constant contact with soil. The plants are producing large number of organic compounds as secondary metabolites.

These compounds acts as chemotherapeutic, bactericidal and bacteriostatics. The extracts are prepared from the leaves and tubers are source of different secondary metabolites which may act in synergy to produce an increased activity against microbes that is in treatment of certain skin disease and infected wounds (Banu and Nagarajan, 2011).

### **Anti-implantation or anti-fertility activity**

Oral administration of hydro alcoholic extract of *G. superba* at two different doses (30 and 60 mg/kg body wt) showed most significant dose dependent anti-fertility activity. The treated animals showed anti-implantation activity in postcoital study (administered from days 1 to 7).

After parturition, the number of litters born was significantly less than that of control. This study clearly reveals that the extract is effective before and after the implantation occurred. Hence, the drug indicated the highest anti-fertility activity (Latha *et al.*, 2013)

### **Anti-oxidant and anti-cancer activity**

The *G. superba* methanolic extracts reveals the presence of different types of phyto constituents which has the capacity of anti-oxidant and cytotoxicity effect on Hep-G2 cells (human liver cancer cells). Thus *G. superba* has the potentiality to inhibit the human carcinoma cell line growth (Simon and Jayakumar, 2016).

### **Anticoagulant and antithrombotic activity**

The leaves extracts displayed anticoagulant properties by inhibiting thrombin induced clotting, with IC<sub>50</sub> value of 2.97 mg/ml<sup>21</sup> (Maroyi and Maesen, 2011)

### **Anti-inflammatory activity**

Alcoholic, hydroalcoholic and aqueous extracts of *G. superba* tubers have been shown to have significant anti-inflammatory activity in male albino rats. According to these investigations, aqueous extract of 250 mg/kg of *G. superba* tubers showed the best anti-inflammatory activity. Oral administration of colchicine at 2, 4 and 6 mg/kg body weight resulted in 48.9, 68.7 and 79.1% inhibition respectively, while 30.9% inhibition was obtained in the phenylbutazone 100mg/kg treated group once daily for a period of 4 days. These results clearly indicate that colchicine is more effective as an anti-inflammatory agent. (Maroyi and Maesen, 2011)

### **Antidiabetic activity**

The phytochemical screening of *G. superba* revealed that it contains saponin glycosides, flavonoids, alkaloids, tannins and steroids. It has been previously documented that flavonoids and phenols are responsible for the hypoglycemic action. So, the anti-diabetic effect of the *G. superba* might be attributed to its flavonoid content (Thakur *et al.*, 2015)

### **Anthelmintic activity**

Bhushan and his co-workers conducted an experiment to know the anthelmintic activity of glory lily. In this study, earthworm lost their motility on exposure to crude extract of plant *Gloriosa superba* Linn. Each aqueous extract containing 30, 40, 50 and 60 mg/mL and alcoholic extract containing 20, 30, 40



and 50 mg/mL produced dose dependent paralysis ranging from loss of motility to loss of response to external stimuli, which eventually progressed to death. From this study it is concluded that, all the extracts of whole plant of *Gloriosa superba* have potent anthelmintic activity when compared with conventionally used drug and is equipotent to standard anthelmintic drug (Bhushan *et al.*, 2010).

### Uterotonic property

Uterotonic assessment *in-vitro* and *in-vivo* of aqueous extract of *G. superba* was carried out in rats. Oxytocin was used as the standard uterotonic. Both the oxytocin and the extract produced dose dependent contractions (Roqaiya *et al.*, 2015)

In conclusion, plants are natural sources of bioactive compounds to treat life threatening diseases. *Gloriosa superba* has showed various phytochemical properties, which can be used for treating various health ailments. Due to overexploitation of this plant is facing local extinction. Hence it is confirmed as an endangered plant by International Union for Conservation of Nature (IUCN). Therefore, there is a need to conserve this plant by *in situ* and *ex situ* multiplication in general and micro propagation.

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