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Gloriosa superba L.: A Concise Review

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G. superba, commonly called the 'Glory lily' or 'Flame lily' has a prominent place in the traditional medicinal system. Ethnomedicinally, the plant is known to treat wounds, arthritis, gout, head lice, and various other ailments. G. superba, belonging to the Liliaceae family, holds an economic significance due to its colchicine content that plays a major therapeutic role in diseases like gout and cancer. The plant is known to contain a lot of substances like benzoic acid, sterols, colchicines, gloriosine, lumicolchicine, tannins, superbine and many others. This article predominantly reviews varying aspects of G. superba ranging from its ethnomedicinal significance to its toxicity and other aspects.

Introduction

Gloriosa superba L. is an aesthetically-pleasing perennial monocot that grows between the lengths of 3.5 - 6 m. The perennial climber, *G. superba* is native to the tropical region of Africa and South-East Asia. The flower of the herbaceous plant is the state flower of Tamil Nadu, India as well as the national flower of Zimbabwe (Ashokkumar, 2015). *G. superba* is one of the widely distributed species in the tropics and as a pot plant, worldwide. The plant is commonly known as 'Karihari' in Hindi, 'Langali' in Sanskrit, 'Nabhik kodi' in Tamil, 'Glory lily' in English (Kavina et al., 2011). The herbaceous plant contains a hollow stem arising from the underground tuberous stem every year, mainly during the monsoon (Jana & Shekhawat, 2011).

According to the observations of Chitra and Kandhasamy (2009), the leaf-shape varied from being linear, lanceolate and ovate in distinct genotypes, albeit the tubers were either V-shaped or L-shaped. The leaves predominantly showed an opposite arrangement, while a few of them also showed an alternate arrangement. The leaf-lamina colour of *G. superba* is mainly pale-green or dark-green, yet a few accessions were observed with pale-green streaks on dark-green coloured lamina (Patel et al., 2020). The flowers range from manifesting magnificent bright yellow to dual coloured purple and yellow or red and yellow. The capsules (fruits) open up to release seeds that are smooth and red containing a spongy testa (Maroyi & Van der Maesen, 2011). Substances like salicylic and benzoic acid, sterols, colchicines, and resinous substances like as colchicines, 3-demethyl colchicine, 1,2-didemethyl colchicine, N-formyl, N-deacetyl colchicines, colchicocide, 2,3-didemethyl colchicine, gloriosine, lumicolchicine, tannins, superbine and many other compounds are recorded to be present in the tubers and the seeds of *G. superba* (Jana & Shekhawat, 2011 and Ashokkumar, 2015).

Taxonomic Classification (Soumya. K. R., 2018)

Kingdom: Plantae

Sub Kingdom: Tracheobiophyta

Division: Magnoliophyta

Sub-division: Angiospermae

Class: Monocotyledons

Sub-class: Liliidae

Order: liliales

Family: Liliaceae

Sub-family: Wurmbeodideae

Genus: *Gloriosa*

Species: *Gloriosa superba* L.

Ethnomedicinal significance

Various parts of the plant have been used for several ethnomedicinal purposes. Some of the uses have been listed below in a tabular format.

Table 1: Ethnomedicinal uses of *G. superba*

Ailment	Plant part	Methodology	Source
Arthritis	Root	Oil prepared by boiling the root in sesame oil is applied twice daily on the affected region	(Ashokkumar, 2015)
Asthma	Tuber	Decoction of tuber is administered	(Bhide & Acharya, 2012)
Delayed childbirth delayed puberty, menstrual problems, and sterility	Leaf and Tuber sap	A soup prepared after due processing is administered	(Padmapriya et al., 2015)
Easy delivery	Root	Root is crushed to paste and applied on the palm and feet	(Kavina et al., 2011)
Gout, stomach ache	Root	Root is crushed to paste and administered	(Kavina et al., 2011)
Insect bites paralysis, rheumatism, and snake bite	Root	Root is crushed to paste and applied on the affected region	(Senthilkumar, 2013)
Lice and Scar	Leaves	Leaves are crushed to paste and applied on the affected region	(Fatima & Girdharilal, 2017)
Neuralgic pain	Tuber	Warm paste of tuber is applied on the affected region	(Patel et al., 2020)
Sinusitis	Tuber	Tuber is crushed to paste and applied on the nose	(Bhide & Acharya ,2012)
Wound	Tuber	Tuber is crushed to paste and applied on the affected region	(Khan et al.,2007)

Pharmacological significance

Anti-bacterial activity

The ethanolic tuber extract of *G. superba* is reported for high antibacterial activity against bacteria like *Staphylococcus aureus, Escherichia coli, Micrococcus luteus, Pseudomonas aeruginosa* and *Salmonella abony* (Uchimahali et al., 2019).

Anti-fungal activity

The ethanolic tuber extract of *G. superba* is reported to have effective anti-fungal activity against fungi like *Rhizopus oryzae, Mucor* sp., *Aspergillus niger*, *Candida krusei*, and *Candida albicans* (Uchimahali et al., 2019).

Anthelmintic activity

The aqueous and ethanolic whole plant extract of *G. superba* is reported for its significant anthelmintic activity against Indian earthworms (*Pheretima posthuma*) when compared to standard drug piperazine citrate (Pawar et al., 2010).

Anti-anxiety activity

The ethanolic extract of *G. superba* has reported a good anti-anxiety activity in mice, while taking Diazepam as a standard drug (Sundaraganapathy et al., 2013).

Toxicity of the plant

Although *G. superba* has excellent medicinal properties, it is also greatly toxic to mankind and livestock. The plant can cause deleterious effects ranging from serious illness to fatalities in case of accidental or deliberate intake. In a case report studied by Premaratna et al. (2015), *G. superba* toxicity manifested clinical symptoms like pancytopenia, gradual hair loss resulting in total alopecia, unexplained gastroenterocolitis. Generally, symptoms like diarrhoea, dysentery, dehydration, nausea, hypovolemic shock, acute renal failure have also been observed (Badwaik et al., 2011). However**,** the traditional knowledge practioners appear to be knowledgeable about the doses and the methods used to minimize the toxic effects of the plant. Mainly, larger doses are responsible for major deleterious effects (Maroyi & Van der Maesen, 2011).

Conservation of the species

G. superba being crucial to obtain colchicines and colchicoides, have substantially been in demand for the pharmaceutical industries. Due to their extensive usage, the plant has been entered into the Red Data book. Various approaches like tissue culture, micropropagation have been tried out to mitigate the trouble. It becomes essential to conserve the plant by creating awareness among the cultivators and involving them in various activities related to conservation. Much more research and awareness programs need to be conducted to conserve such medicinal plant species.

Conclusion

Traditional medicinal systems have been an alternative to the synthetic medicines mainly due to benefits like easy availability, minimum side effects. *G. superba*, is well-known for its ethnomedicinal as well as therapeutic uses. Having an immensely strong ethnomedicinal and therapeutic profile, makes *G. superba* an important species that needs to be conserved. Numerous

conservation strategies have been employed at various levels to overcome the problem. The plant also needs to be further researched upon as it may unravel new and amazing therapeutic uses.

References

Ashokkumar, K. (2015). *Gloriosa superba* (L.): a brief review of its phytochemical properties and pharmacology. *International Journal of Pharmacognosy & Phytochemical Research, 7*(6), 1190-1193.

Badwaik, H., Giri, T. K., Tripathi, D. K., Singh, M., & Khan, A. H. (2011). A Review on Pharmacological Profile for Phytomedicine Known as *Gloriosa superba* Linn. *Research Journal of Pharmacognosy and Phytochemistry, 3*(3), 103-107.

Bhide, B., & Acharya, R. (2012). Uses of Langali (*Gloriosa superba* Linn.): An Ethnomedicinal Perspective. *Ayurpharm – International Journal of Ayurveda and Allied Sciences, 1*(3), 65-72.

Chitra R, & Kandhasamy R. (2009) Genetic variability, heritability and scope of improvement for yield components in glory lity (*Gloriosa superba* L.). *International Journal of Plant Breeding, 3*(2), 139-143.

Fatima, S., & Girdharilal, J. R. (2017) Review of ethnomedicinal uses of *Gloriosa superba* plant of Nandurbar district, Maharashtra. *Epitome, 3*(7).

Jana, S., & Shekhawat, G. S. (2011). Critical review on medicinally potent plant species: *Gloriosa superba*. *Fitoterapia, 82*(3), 293-301.

Kavina, J., Gopi, R., & Panneerselvam, R. (2011). *Gloriosa superba* Linn—A Medicinally important plant. *Drug Invention Today, 3*(6), 69-71.

Khan, H., Ali Khan, M., & Hussan, I. (2007). Enzyme inhibition activities of the extracts from rhizomes of *Gloriosa superba* Linn (Colchicaceae). *Journal of Enzyme Inhibition and Medicinal Chemistry, 22*(6), 722-725.

Maroyi, A., & Van der Maesen, L. J. G. (2011). *Gloriosa superba* L.(family Colchicaceae): Remedy or poison?. *Journal of Medicinal Plants Research, 5*(26), 6112-6121.

Padmapriya, S., Rajamani, K., & Sathiyamurthy, V. A. (2015). Glory lily (*Gloriosa superba* L.)-A review. *International Journal of Current Pharmaceutical Review and Research, 7*(1), 43-49.

Patel, A. I., Desai, B. S., Chaudhari, B. N., & Vashi, J. M. (2020). Genetic improvement in glory lily (*Gloriosa superba* L.): A review. *International Journal of Chemical Studies, 8*(4), 255-260.

Pawar, B. M., Wavhal, V. P., Pawar, N. D., Agarwal, M. R., Shinde, P. B., & Kamble, H. V. (2010). Anthelmintic activity of Gloriosa superba Linn (Liliaceae). *International Journal of PharmTech Research, 2*(2), 1483-1487.

Premaratna, R., Weerasinghe, M. S., Premawardana, N. P., & de Silva, H. J. (2015). Gloriosa superba poisoning mimicking an acute infection-a case report. *BMC pharmacology and toxicology, 16*(1), 1-4.

Senthilkumar, M. (2013). Phytochemical screening of *Gloriosa superba* L.-from different geographical positions. *International Journal of Scientific and Research Publications, 3*(1), 1-5.

Soumya. K. R (2018). *Gloriosa superba* L. (Malabar Glory Lily): A review. *International Journal of Basic and Applied Research* 8(12), 914-927.

Sundaraganapathy, R., Niraimathi, V., Thangadurai, A., Kamalakannan, D., Narasimhan, B., & Deep, A. (2013). Anti-anxiety activity of *Gloriosa superba* Linn. *Hygeia Journal for Drugs And Medicines, 5*(1), 148-151.

Uchimahali, J., Jebamalar, A., Duraikannu, G., & Thirumal, S. (2019). Phytochemical analysis and evaluation of antimicrobial activity in the whole plant extracts of *Gloriosa superba*. *Phytochemical Analysis*, *12*(6), 245-249.