Gloriosa superba L.: A Concise Review

Rajeshwari Iyer1* and Sanila Quadri2

1Biological & Life Sciences, School of Arts and Sciences, Ahmedabad University
2Maharaja Sayajirao University, Baroda, Gujarat
*Corresponding author. E-mail: rajeshwarir4sept1996@gmail.com

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: liliiales
Family: Liliaceae
Sub-family: Wurmbeoidae
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

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


