

## SHORT COMMUNICATION

STUDIES ON *GLORIOSA SUPERBA* GROWN IN SRI LANKA

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**Abstract:** Studies on the cultivation of *Gloriosa superba* in Sri Lanka have been carried out. The analytical studies on different parts of this plant growing in different areas indicated that the highest content of total alkaloids (0.6 - 0.9%) and colchicine (0.15 - 0.25%) are found in the seeds. In addition to the yams and leaves the pericarp too contained alkaloids.

### 1. Introduction

*Gloriosa superba* Linn. (S. Niyagala) is a perennial herbaceous climber occurring in the shrub forests in Sri Lanka. It is native to tropical Asia and Africa. This plant can be easily propagated by tuber cuttings. The tubers of *Gloriosa superba* are regarded as tonic, stomachic and anthelmintic. In large doses it is extremely poisonous. Colchicine which is the main alkaloid is used in plant polyploidy and in the treatment of gout.

*Gloriosa superba* is a commercially important medicinal plant and a good export market exists for its seeds. Therefore studies on pilot scale cultivation of *Gloriosa superba* were carried out by the Ceylon Institute of Scientific and Industrial Research. The agronomical data are now available to farmers who are interested in cultivation of this plant. Already a private organization has started systematic cultivation and export of seeds of *G. superba*.

Several studies on *G. superba* have been reported<sup>1-3</sup> in literature. The present report deals with analytical and phytochemical studies on *G. superba* growing in Sri Lanka.

### 2. Experimental

#### 2.1 Plant Materials

The plant materials for the study were collected from the wild *G. superba* plants growing in different areas of the country and also from the plants cultivated at the CISIR experimental plot.

#### 2.2 Extraction of Alkaloids

Powdered plant material (20 g) was extracted with ethyl alcohol using a soxhlet extractor. The solution was evaporated, dissolved in sodium sulphate solution and

washed with ether. The aqueous solution was basified and extracted with chloroform. The alkaloids were obtained by evaporating the chloroform.

### 2.3 Estimation of Colchicine

This was carried out by tlc - densitometric method. Known quantities of the standard and the sample were spotted on thin layer chromatographic plates which were developed in methanol-chloroform (3:47) solvent system. The plates were scanned at  $\lambda$  350 nm. The concentration of colchicine in the sample was calculated by comparing with the standards. The spots were scraped off and extracted with methanol - chloroform mixture and their identity was confirmed by comparing the spectral data of the isolated compound with reported data.

The tlc - densitometric method was compared with uv spectrophotometric method and similar results were obtained for both methods.

### 2.4 Isolation and Identification of Alkaloids

The alkaloids were isolated by preparative tlc on alumina plates. The structures of isolated compounds were confirmed by employing MS, NMR, UV, and IR spectral data.

## 3. Results and Discussions

The different parts of *Gloriosa superba* plant were analysed for the total alkaloid and colchicine contents.

Part examined	No. of samples	Total alkaloids %	% Colchicine
Seeds	20	0.6 - 0.9	0.15 - 0.25
Mother Yams	15	0.1 - 0.4	0.02 - 0.2
Sister Yams	05	0.05 - 0.3	0.03 - 0.1
Mature Leaves	08	0.05 - 0.2	0.01 - 0.05
Young leaves	08	0.02 - 0.1	0.01 - 0.06
Pericarp	05	0.1 - 0.4	0.25 - 0.1

The analysis of mother yams and sister yams indicated that mother yams have a higher content of total alkaloids and colchicine than the sister yams. Young leaves contained less alkaloids than the mature leaves. An interesting feature was the presence of a reasonably high quantity of alkaloids in the pericarp which is normally discarded after harvesting the seeds. No distinct difference in the alkaloid content was observed in the samples collected from different areas. The ages of these plants were not known as they were mostly collected from the jungles.

The yields of colchicine reported in our studies are higher than the yield reported by Dunuwila *et al.*<sup>3</sup> for tubers collected from Sri Lanka. Their low values may be due to significant losses occurring during isolation. The colchicine contents in the local plants are high compared to the values reported for Indian tubers.<sup>1</sup>

The tlc-densitometric method that was employed to determine the colchicine content of the samples was a rapid and a sensitive technique. This is a less tedious method compared to UV-spectrophotometry and less expensive than High Pressure Liquid Chromatography.

The studies on isolation and identification of alkaloids indicated that colchicine is the major alkaloid present in all parts of the plant. N-formyl desacetyl colchicine was isolated from leaves and yams and lumicolchicine from seeds. These compounds have been previously reported in *G. superba*.<sup>1-3</sup>

#### References

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