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Phytochemical Constituents of *Gloriosa superba* Seed, Tuber and Leaves

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ABSTRACT

Phytochemical constituents of methanolic extract of *Gloriosa superba* seed, tuber and leaves (MEGSSTL) were assessed by preliminary phytochemical screening analysis. Phytochemical analysis of the *Gloriosa superba* seed showed the presence of Carbohydrates, Alkaloids, Glycosides, Flavanoids, Steroids, Terpenoids and Phenolics; *Gloriosa superba* tuber showed the presence of Carbohydrates, Alkaloids and Flavanoids; *Gloriosa superba* leaves showed the presence of Carbohydrates, Alkaloids, Flavanoids, Steroids and Terpenoids.

Keywords: Carbohydrates, Alkaloids, Glycosides, Flavanoids, Steroids, Terpenoids and Phenolics.

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INTRODUCTION

Medicinal plants form the backbone of Traditional Systems of medicine in India. Pharmacological studies have acknowledged the value of medicinal plants as potential source of bioactive compounds [25]. Phytochemicals from medicinal plants serve as lead compounds in drug discovery and design. They are rich source of novel drugs that forms the ingredients in Traditional Systems of medicine, modern medicines, nutraceuticals, food supplements, folk medicines, pharmaceutical intermediates, bioactive principles and lead compounds in synthetic drugs [14].

Plant produce an enormous array of secondary metabolites, and it is commonly accepted that a significant part of this chemical diversity serves to protect plants against microbial pathogens [6]. Since secondary metabolites from natural resources have been elaborated within living systems, they are often perceived as showing more "drug likeness and biological friendliness than totally synthetic molecules" making them good candidates for further development [15].

Polyphenols are secondary plant metabolites of high diverse chemical structure. More than 500 polyphenols have been described in common foods and beverages. During the last decade, the interest of polyphenols has increased considerably, especially among food scientists, nutritionalist, the agricultural or food industry and the consumers [19]. Phenolic compounds in various plant products are well recognized as dietary antioxidants. It has been shown that phenolics possess a radical scavenging and metal chelating activity as well as anticarcinogenic properties [30].

Gloriosa superba is commonly known as Malabar glory and it is a perennial creeper in the family Liliaceae, native to Africa. Its stem is thin and grows at the rate of 20 feet per year. Leaves are ovate in shape about 6-8 inches long thread like at the apex that helps to climb on the trees. This plant contains 0.2-0.3 percent colchicins and gloriosine alkaloids. This plant is used as an ayurvedic medicinal herb to cure diseases like arthritis, gout, ulcers, and bleeding [33].

MATERIALS AND METHODS

Collection of plant material

Fresh seed, tuber and leaves of *Gloriosa superba* were collected from the outskirts of Thanjavur district, Tamilnadu. The collected seed, tuber and leaves were washed thoroughly in tap water, shade dried and finely powdered.

Preparation of MEGSSTL

Ten gram of seed, tuber and leaf powder of *Gloriosa superba* was filled in the thimble and extracted with 150 ml of methanol using a soxhlet extractor for 24 hours. The methanol

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extract was then distilled and evaporated to dryness. The concentrated extract was then accurately weighed and stored in small vials at -20^0 C for further use.

Preliminary phytochemical screening

Phytochemical constituents of MEGSSTL were assessed by preliminary phytochemical screening analysis. Phytochemical screening was performed using standard procedures. The procedures for detection of alkaloids, flavonoids, saponins, phenols, glycosides [27],tannins, carbohydrates [12], steroids and terpenoids [32].

RESULTS

Phytochemical constituents of MEGSSTL were assessed by preliminary phytochemical screening analysis.

Preliminary phytochemical screening

Phytochemical analysis of the *Gloriosa superba* seed showed the presence of Carbohydrates, Alkaloids, Glycosides, Flavanoids, Steroids, Terpenoids and Phenolics (Table 1).

Table 1: Phytochemical constituents of MEGSSTL

Phytochemicals	Methanolic extract of *Gloriosa superba* seed	Methanolic extract of *Gloriosa superba* tuber	Methanolic extract of *Gloriosa superba* leaves
Carbohydrates	+	+	+
Alkaloids	+	+	+
Glycosides	+	-	_
Flavanoids	+	+	+
Tannins	-	-	_
Steroids	+	-	+
Saponins	-	-	_
Terpenoids	+	-	+
Phenolics	+	-	_

Phytochemical analysis of the *Gloriosa superba* tuber showed the presence of Carbohydrates, Alkaloids and Flavanoids (Table 1).

Phytochemical analysis of the *Gloriosa superba* leaves showed the presence of Carbohydrates, Alkaloids, Flavanoids, Steroids and Terpenoids (Table 1).

DISSCUSSION

Plant-derived substances have recently become of great interest owing to their versatile applications. Plants are potent biochemists and have been components of phytomedicine since times immemorial; man is able to obtain from them a wondrous assortment of industrial chemicals [2]. Plant based natural active components can be derived from any part of the plant

like bark, leaves, flowers, roots, fruits, seeds. The systematic screening of plant species with the purpose of discovering new bioactive compounds is a routine activity in many laboratories. Scientific analysis of plant components follows a logical pathway [29].

Extraction methods used pharmaceutically involves the separation of medicinally active portions of plant tissues from the inactive/inert components by using selective solvents. During extraction, solvents diffuse into the solid plant material and solubilize compounds with similar polarity [18]. The purpose of standardized extraction procedures for crude drugs (medicinal plant parts) is to attain the therapeutically desired portions and to eliminate unwanted material by treatment with a selective solvent known as menstrum. The extract thus obtained, after standardization, may be used as medicinal agent as such in the form of tinctures or fluid extracts or further processed to be incorporated in any dosage form such as tablets and capsules. These products contains complex mixture of many medicinal plant metabolites, such as alkaloids, glycosides, terpenoids, flavonoids and lignans [20].

Satureja montane L. known as winter savory and Satureja cuneifolia Ten. or wild savory, are rich sources of biologically active phytochemicals. The positive effects of savory of human health are attributed to its active constituents such as essential oil, triterpenes, flavanoids, and rosmanic acid [3]. Tree nuts are highly nutritious and provide macronutrients, micronutrients, lipophylic, bioactive compounds and phytochemicals such as phenolic acids, flavonoids, stillbenes, lignins, hydrolysable tannins, carotenoids, alkaloids and terpenes [1]. The main biologically active substances detected in the medicinal vegetal-raw material of monogynous hawthorn are flavonoids and their glycosides; Hyperoside, quercetine, vetexin, vitexin-o-rhamnoside, isovitexin-o-rhamnoside, acetyl vitexin-o-rhamnoside, rutin, quercitrin, orietin, kaempferol, spireoside, sapaononaretin, oligomericprocynidins, catechins and phenolic acids [4].

A variety of plant secondary metabolites have been reported to act as antioxidants and among them phenolic compounds form a major group [26]. Major classes of phytochemicals present in plants are phenolic polyphenols, terpenoids and essential oils, alkaloids, rectin and polypeptides [32]. Tannins may be monomeric or polymeric and can be divided into condensed and hydrolysable tannins. Two of the most important extractable components are waxes and phenolic aldehydes and coumarins, the group of phenolic compounds also includes the chemical families of flavonoids and tannins [10].

Phytochemical characterization shows the presence of tannins, steroids, alkaloids, flavonoids and saponins is the stem bark of Bauhinia variegata Linn. [11]. The fruits of Hyphaene thebaica contain β-carotene cyanidin-3-glucoside, brevifolin, carboxylic acid, ellagic acid and tannins [21].

Dietary plant phenolic compounds have been described to exert a variety of biological actions such as free radical scavenging, metal chelation, modulation of enzymatic activity and more recently to affect signal transduction, activation of transcription factors and gene expression [6]. The rinds of Garcinia India, commonly known as kokam are rich in organic acid

mainly hydroxyl citric acid, garcinol, malic acid, citric acid and tartaric acid useful in piles, dysentery, pains and heavy complaints [13]. Biflavonoids from Ouratea has been found to posses cytotoxic and antitumour activities [8]. Swertiamarin alkaloids, triterpenoids, steroids, saponins, flavonoids, xanthones, phenolic acids were isolated from Enicostemma axillare [34]. The radical-scavenging capacities of oregano and thyme extracts have been observed in different model systems. [35].

Green plants represent a reservoir of effective chemicals, the rapeutants and can provide valuable sources of natural pesticides [22]. Phytochemicals are as antimicrobial compounds and pesticides of antimicrobial agents which found in aromatic and essential oil plants which have made great contribution for quick and effective management of plant disease and microbial contamination in several agricultural conditions [31].

Phytochemical analysis of the *Gloriosa superba* seed showed the presence of Carbohydrates, Alkaloids, Glycosides, Flavanoids, Steroids, Terpenoids and Phenolics; *Gloriosa superba* tuber showed the presence of Carbohydrates, Alkaloids and Flavanoids; *Gloriosa superba* leaves showed the presence of Carbohydrates, Alkaloids, Flavanoids, Steroids and Terpenoids. Crude extracts of Vitex leucoxylon revealed the presence of alkaloids, flavonoids, terpenoids, steroids, phenolics, carbohydrates, amino acids and uinines [5]. Phytochemical analysis of screened leaf extracts of Ricinus Communis revealed the presence of alkaloids and flavonoids [17]. Presences of alkaloids, carbohydrates, tannins and phenols, gums and mucilage, fats and saponins was noted in the leaf extracts of Aegle marmelos [9].The phytochemical analysis of the crude extracts of the leaves of both L. abyssinica and L. decurrens revealed the presence of only alkaloids and tannins [23]. Concentration of saponins were high in the aqueous extract while the same were moderate in the methanol extract of Agave sisalana [7].Chromolaena odorata (leaf), Citrus sinensis (ripe and unripe peels) extracts revealed the presence of alkaloids, flavonoids, cyanogenic glycosides, cardiac glycosides, tannins and saponins as the phytochemical components present in the leaves of both herbs [28]. M. pudica extract showed the presence of bioactive components like terpenoids, flavonoids, alkaloids, quinones, phenols, tannins, saponins and coumarin [24].

CONCLUSION

Phytochemical studies on the MEGSSTL where carried out with a view to standardize and distinguish the characters of seed, tuber and leaf. Qualitative phytochemical values showed variation among the three variants.

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