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Research Article

Phytochemical Screening of *Gloriosa superba* Indian Medicinal Plant

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Abstract

From the ethno medicinal practicethe plant *Gloriosa superb* was selected for the present study. Plant was collected from Bhopal. The collected leaves were dried at room temperature for two weeks. The crude drugs were powdered by grinder and extracts with alcohol and chloroform. These extracts were used for further studies. Phytochemical studies had been performed on the extracts and it was found to have alkaloids, carbohydrates ,flavonoids, saponins ,tannins,phenolic compounds and steroids in ethanolic extracts having triterpines,flavonoids,tannins and phenolic compounds.

Keyword : Etheno medicinal,*Gloriosa superb*,flavonoids , saponins.

Introduction

Medicinal plants have been a rich source of biologically active compounds and play an important role in drug discovery. ***Gloriosa superba*** is a species of flowering plant in the family Colchicaceae. Common names include flame lily, climbing lily.

Use of *Gloriosa superba*:

1. Analgesic and anti-inflammatory potential
2. Chemotherapeutic potential
   a) Antimicrobial properties
   b) Antipoxviral potential
   c) Larvicidal potential
3. Anti-Thrombotic/Anti-coagulant potential
4. Anti-tumour potential
5. Enzyme inhibition potential
6. Treatment of snake bite
7. Against Familial Mediterranean Fever

Free radical formation and high lipid profile level in the body cause serious metabolic disorders. The free radicals are formed due to several reasons like oxidative stress, chemical reactions in the liver, smoking, alcoholism, environmental pollution and viral infection. High lipid profile is due to obesity, high fat diet, lack of exercise and oxidative stress may lead to severe complications including diabetes, cholestrenimia, hypertension, cardiovascular disease etc.

Synthetic drugs are available for almost all these ailments but they produce some toxic side effect. Several herbs and herbal products are known to posse's antioxidant agent by folk claim. Herbal drugs are more preferred because they are easily availability, cost effective and lesser side effect. So a scientific study has to be done in order to evaluate antioxidant activity of *Gloriosa superba* leaves to prove the folk claim.[1-5]

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Materials and Methods

Plant Material

The leaves of *Gloriosa superba* belonging to family were Colchicaceae collected from govt. Nursery, Bhopal, India in month of September 2019, and air dried at room temperature after wash with tape water. The Plant material was authenticated by, Raw Material Herbarium & Museum, B.U. Bhopal. The crude drugs were powdered in hand grinder after drying.

Preparation of plant extract

Principle: The successive solvent extraction procedure was adopted for the preparation of various extracts of *Gloriosa superba.* The material was subjected to successive extraction with solvents in their ascending order of polarity. In this process the substance, which is soluble in a solvent with particular range of polarity, is extracted in the solvent and remaining marc further extracted with next solvent. The constituents, which are soluble in both polar and non-polar solvents, can be extracted separately by adopting this approach.

Materials Sample: Leaves powder of *Gloriosa superba*

Solvents: alcohol, chloroform.

Method Uses: Reflux method

Procedure: The crude powdered drug was taken and subjected for successive solvent extraction. The extraction was carried out for 16 hrs with the following solvents in the increasing order of the polarity (i.e. chloroform and ethanol). A 1:4 w/v ratio of drug and solvent was maintained.

Preparations of extract:

About 300 g of the fruit powder of *Gloriosa superba* was extracted with 1.2 L of Chloroform using Soxhlet apparatus for 16 hrs at 40-50°C. The extract was concentrated to ¼ of its original volume by distillation as it was adapted to recover the solvent, which could be used again for extraction.[6-7]

Preparation of ethanolic extract:

After complete drying of, the above marc remained after Chloroform extraction was extracted with alcohol to get ethanolic extract.

Preliminary Phytochemical Analysis

The extracts obtained were subjected to various chemical tests to detect the chemical constituents present in them.

Detection of Carbohydrates

Extracts were dissolved individually in 5ml of distilled water and filtered. The filtrates were used to test the presence of carbohydrates.

a) Molisch's Test: Filtrates were treated with 2 drops of alcoholic α-naphthol solution in a test tube and 2 ml concentrated sulphuric acid was added carefully along the sides of the test tubes. Formation of violet ring at the junction indicates the presence of carbohydrates.

b) Benedict's Test: Filtrates were treated with Benedict's reagent and heated on water bath. Formation of an orange red precipitate indicated the presence of reducing sugars.

c) Fehling's Test: Filtrates were hydrolyzed with dilute hydrochloric acids, neutralized with alkali and heated with Fehling's A and B solutions. Formation of red precipitate indicates the presence of reducing sugars.

Detection of Alkaloids

Extracts were dissolved individually in dilute hydrochloric acid and filtered. The filtrates were tested carefully with alkaloid reagents.

a) Mayer's Test**:** Filtrates were treated with Mayer's reagent (potassium mercuric iodide), formation of a yellow cream precipitate indicate the presence of alkaloids.

b) Wagner's Test: Filtrates were treated with Wagner's reagent (iodine in potassium iodide) and observed. Formation of brown/reddish brown precipitate indicates the presence of alkaloids.

c) Dragendroff's Test: Filtrates were treated with Dragendroff's reagent (solution of potassium bismuth iodide). Formation of red precipitate indicates the presence of alkaloids.

d) Hager's Test: Filtrates were treated with Hager's reagent (saturated picric acid solution). Formation of yellow colored precipitate indicate the presence of alkaloids.

Detection of Glycosides

Extracts were hydrolyzed with dilute hydrochloric acid, and the hydrolysate was subjected to glycosides tests.

a) Modified Borntrager's Test: The extracts were treated with ferric chloride solution and heated on boiling water bath for about 5 min. The mixture was cooled and shaken with equal volume of benzene. The benzene layer was separated and treated with half of its volume of ammomia solution. The formation of pink or cherry red color in the ammonical layer indicates the presence of anthranol glycoside.

b) Legal's Test : The extracts were treated with sodium nitroprusside in pyridine and methanolic alkali. The formation of pink to red color indicate the presence of cardiac glycoside.

c) Killer killani Test: 0.5g of dried extract was dissolved in 2 ml of glacial acetic acid containing one drop of ferric chloride solutions. This was then under laid with 1 ml of concentrated H_2SO_4. A brown ring obtained at the presence of a cadenolides.

Detection of Saponins

a) Froth's Test: The extracts were diluted with distilled water to 20 ml shaken in a graduated cylinder for 15 min. The formation of 1 cm layer of foam indicates the presence of saponins.

b) Liberman buchard's Test **:** The extracts were treated with chloroform and filtered. The filtrates were treated with few drops of acetic anhydride boiled and cooled. Concentrated sulphuric acid was added through the sides of the test tube. The formation of brown ring at the junction indicated the presence of steroidal saponins.

Detection of Phytosterols

a) Salkowski's Test**:** The extracts were treated with chloroform and filtered separately. The filtrates were treated with few drops of concentrated sulphuric acid, shaken and allowed to stand. If the lower layer turns red, sterols are present. If lower layer turns golden yellow triterpenes are present.

Detection of Fixed Oils and Fats

a) Stain Test**:** Small quantity of extracts was pressed between two filter paper separately. An oily stain on filter paper indicates the presence of fixed oil.

b) Soap Test: The extracts were heated on water bath with 0.5 N alcoholic potassium hydroxide solutions. Formation of soap indicates the presence of fixed oils and fats.

Detection of Flavonoids and Tannins

a)Ferric chloride Test: The extract was treated with few drops of neutral ferric chloride solution. The formation of bluish black color indicates the presence of phenolic nucleus.

b) Gelatin Test **:** To the extract, 1% gelatin solution containing sodium chloride was added. The formation of white precipitate indicates the presence of tannins.

c) Lead acetate Test: The extracts were treated with few drops of lead acetate solution, formation of yellow precipitate indicates the presence of flavonoids.

d) Alkaline reagent Test: The extracts were treated with few drops of sodium hydroxide separately. Formation of intense yellow color, which becomes colorless on addition of few drops of dilute acid, indicates the presence of flavonoids.

e) Shinoda Test**:** The extracts were treated with few fragments of magnesium metal separately, followed by drop wise addition of concentrated hydrochloric acid. The formation of magenta color indicates the presence of flavonoid.

f) Vanillin hydrochloric Test: The extracts were treated with few drops of vanillin hydrochloride reagent. The formation of red color indicates the presence of tannins.

Detection of Proteins and Amino Acids

a) Millons Test: The extracts were treated with 2 ml of Millons reagent. The formation of white precipitate, which turns to red upon heating, indicates the presence of proteins.

b) Biuret Test: The extracts were treated with 1ml of 10% sodium hydroxide solution and heated. A drop of 0.7% copper sulphate solution to the above mixtures was added. The formation of purplish violet color indicates the presence of proteins.

c) Ninhydrin Test: To the extracts, 0.25% ninhydrin reagent was added and boiled for few minutes. Formation of blue color indicates presence of amino acid. [7-11]

Result and Discussion

Plant Extract

Leaves of *Gloriosa superba* was selected for the present study. The crude drugs were powdered and successively extracted with ethanol and chloroform. The nature of extracts and their extractive value are reported in Table no.2.

The successive extracts of drug were analyzed for the presence of various constituents. The result of this preliminary phytochemical examination is shown in Table no 1.

The result of my study on *Gloriosa superba* revealed presence of saponins, phytosterols, fixed oils and amino acids in petroleum ether extract; presence of cardiac glycoside, carbohydrates, phytosterols, saponins, phenolics and tannins in alcoholic extract and cardiac glycoside, carbohydrates, phenolics compounds and tannins, proteins and amino acids in aqueous extract.

Conclusion

The qualitative analysis of *Gloriosa superba* leaves extract indicated the presence of flavonoids and polyphenols which are natural antioxidants. Therefore , this plant deserves further studied to identify the of antioxidant activity.

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Table No: 1 Physical appearance and extractive values of leaves of *Gloriosa superba*

S.no	Plant	Solvent	Colour	% Extractive Values
1.	***Gloriosa superba***	alcohol	Dark Green	25.7
		Chloroform	Black	13.5

Table No: 2 Prelimimary phytochemical screening of chloroform and ethanolic extract of *Gloriosa superba* leaves

S. No.	TEST	Extract	
		Chloroform	Alcohol
1.	**ALKALOIDS** Mayer test	+++	+++
	Wagner's test	+++	+++
	Dragendroff s test	+++	+++
	Hagers test	+++	+++
2.	**GLYCOSIDE** Brontragers test	+	+
	Legals test	+	++
	Killer killani test	++	++
3.	**SAPONINS**		
	Foam test	+	++
	Liberman Buurchard test	-	+
4.	**PHYTOSTEROLS**		
	Salkowski's test	-	++
	Lliberman's Burchard test	+++	+++
5.	**PHENOLICS AND TANNINS**		
	Ferric chlorides test	+++	+++
	Gelatin test	++	++
	Lead acetate test	+++	+
	Alkaline reagent test	+	+
	Vanillin hydrochloride test	+++	+++
	Shinoda test	+++	+++
6.	**PROTEINS AND AMINO ACIDS**		
	Millons test	++	+
	Biuret test	+	-
	Ninhydrin test	-	-
7.	**FIXED OILS AND FATS**		
	Stain test	-	-
	Soap test	+	+
8.	**CARBOHYDRATES**		
	Molish test	+++	+++
	Benedicts test	+	++
	Fehling's test	++	+

- Absent, + Slightly present, ++ Moderately present, +++ Prominently present