INTERNATIONAL JOURNAL OF PHARMACEUTICAL SCIENCES
[ISSN: 0975-4725; CODEN(USA):IJPS00]
Journal Homepage: https://www.ijpsjournal.com

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Research Article

Morphology and Phytochemical analysis of Plant *Girardinia diversifolia* also known as BichuButi

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ARTICLE INFO

Received: 19 June 2024
Accepted: 23 June 2024
Published: 13 July 2024
Keywords:
Plant, Bichubuti, Morphology, Phytochemical
DOI:
10.5281/zenodo.12737912

ABSTRACT

Plant Girardinia diversifolia belonging to the family Urticaceae was used to treat various disease and have different phytochemicals which show different pharmacological activities like antioxidants, antimicrobial, antidiabetics and many more. This study is perform to check it's phytochemical and its morphological analysis of the plant which help to understand the plant more in future.

INTRODUCTION

Medicinal plants have been used since ancient time for the benefit and welfare of human beings, as time passed pharmaceutical industries started to use medicinal plants to manufacture herbal preparations based on established therapeutic efficacy explored from crude extracts or their essentials oils (1). Herbal medicine is widely used by different communities all over the globes as it is simple, cheap, and has fewer side effects compare to medicine of synthetic origin. Today, almost 30% of the pharmaceutical preparation are based on plants and it is highly observable that most developed countries import their raw materials of therapeutically important plants from developing countries (2). Wound healing is a normal biological process in human body, where body heals itself and we provide external support to enhance the healing process through extract. There are three types of wound healing that are primary, secondary and tertiary. Where primary stage heals quickly on other hand secondary phase take longer time to heal and any major injuries or symptoms of infection should be healed by treatment. (3) Skin wound healing is a mechanism which is an important step for survival finalizing in wound closure. The physiological regulation of skin is different for different persons therefore the

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Relevant conflicts of interest/financial disclosures: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

skin wound healing is complex process. It depends on cell type and interaction with the extract we use. (4)

Description of plant

The robust, upright perennial herb Girardinia diversifolia (Link) Friis (Urticaceae) grows to a height of 25–200 cm and has a perennial rootstock. There are many tiny, stinging hairs on the aerial portions, and the leaves feature three to five deep lobes with bristles that are saw toothed. The male flowers are white and borne in lower axillary panicles, while the female flowers are grouped in upper bristly axillary and terminal panicles. The flowers are yellowish and grouped in a panicle. Fruits ripen from September to November and flowers from July to September The plant grows in clumps with numerous stems, and its bark has strong, silky, and light fibers that are commonly used in Nepali textiles. G. diversifolia is widely distributed throughout Nepal, especially in highland forests with wet and humid conditions. In addition, it can be found in Africa, Myanmar, Malaysia, Indonesia, eastern China, Bhutan, Sri Lanka, and northern India. Because of its large, palm-like leaves, the plant is known as "allo" or "chalnesisno" in Nepali. Because of its stinging hairs that irritate skin when touched, it is popularly referred to as "Himalayan nettle" in English.

Classification

1. Kingdom : Plantae
2. Phylum: Tracheophyta
3. Class: Magnoliopsida
4. Order: Rosales
5. Family : Urticaceae
6. Genus: Girardinia
7. Species: Girardinia Diversifolia

MATERIAL AND METHOD

Plant material collection and extraction

Girardinia diversifolia leaves were collected from the surrounding area of chail chowk , himachal Pradesh, india, and shadow-dried for 25 days before milled into powder. Amber-colored bottles were used to store powder. A 200-gram sample of plant powder was obtained, and depending on its polarity. We preapare our plant extract utilizing the soxhlet Extraction process, which entails employing multiple solvents depending on their polarity, Examples of solvents include alcohol, petroleum ether,ethanol and chloroform. The leaves was extracted using ethanol as a solvent. 150gm of powder was extracted with 500 ml of ethanol for 4hr. The ethanolic extract of Girardinia diversifolia was concentrated with distillation method and evaporate excessive solvent.

Morphology

Medicinal plant materials are categorized according to sensory, microscopical and macroscopical characteristics. Taking into consideration the variations in sources of crude drug and their chemical nature, they are standardized by using different techniques including the methods of estimation of chief active constituents. Organoleptic evaluation of drugs refers to the evaluation of drugs by colour, odour, size, shape, taste and special features including touch and texture etc. They are of primary

importance before any further testing can be carried out. Organoleptic evaluations can be done by means of organs of sense which includes the above parameters and thereby define some specific characteristics of the material which can be considered as a first step towards establishment of identity and degree of purity. The following organoleptic investigations were done.

Microscopical characters

Microscopic examination is employed for the quantitative evaluation and for this purpose some cell size measured by using micrometer and specific histological features including, stomatal index, vein-islet and vein termination number and palisade ratio were noted . Girardinia diversifolia belonging to the family Urticaceae is a stout, erect, perennial herb, 25–200 cm tall, with a perennial rootstock. The aerial parts are armed with numerous slender stinging hairs and the leaves have 3–5 deep lobes, and are saw-toothed with bristles. The flowers are yellowish, clustered in a panicle; the male ones are white and borne in lower axillary panicles; the female ones are grouped in upper bristly axillary and terminal panicles. Flowers appear from July to September and fruits from September to November (17).

Phytochemical analysis

Phytochemical analysis is perform to identify different phytochemical present in the leaf of Girardinia diversifolia by using different tests (5).

1. Test for Alkaloids

a. Mayer's test

Take few ml of plant sample extract, two drops of Mayer's reagent are added along the sides of test tube. Appearance of white creamy precipitate indicates the presence of alkaloids (6).

b. Wagner's test

A few drops of Wagner's reagent are added to few ml of plant extract along the sides of test tube. A reddish- Brown precipitate confirms the test as positive (7).

2 Test for Carbohydrates

a. Molish's test

To 2 ml of plant sample extract, two drops of alcoholic solution of α- naphthol are added. The mixture is shaken well and few drops of concentrated sulphuric acid is added slowly along the sides of test tube. A violet ring indicates the presence of carbohydrates.

b. Benedict's test

To 0.5 ml of filtrate, 0.5 ml of Benedict"s reagent is added. The mixture is heated on a boiling water bath for 2 minutes. A characteristic coloured precipitate indicates the presence of sugar.

3. Test for Fixed oils and Fats

a. Spot test

A small quantity of extract is pressed between two filter papers. Oil stain on the paper indicates the presence of fixed oils.

b. Saponification test

A few drops of 0.5 N alcoholic potassium hydroxide solution is added to a small quantity of extract along with a drop of phenolphthalein. The mixture is heated on a water bath for 2 hours. Formation of soap or partial neutralization of alkali indicates the presence of fixed oils and fats (8).

4. Test for Glycosides

For 50 mg of extract is hydrolysed with concentrated hydrochloric acid for 2 hours on a water bath, filtered and the hydrolysate is subjected to the following tests.

a. Borntrager's test

To 2 ml of filtered hydrolysate, 3 ml of choloroform is added and shaken, choloroform layer is separated and 10% ammomia solution is added to it. Pink colour indicates presence of glycosides (6).

b. Legal's test

50 mg of extract is dissolved in pyridine, sodium nitroprusside solution is added and made alkaline using 10% NaOH. Presence of glycoside is indicated by pink colour.

5. Test for Phenolic compounds and Tannins

a. Ferric Chloride test

The extract (50 mg) is dissolved in 5 ml of distilled water. To this few drops of neutral 5% ferric chloride solution are added. A dark green colour indicates the presence of phenolic compound (9).

b. Gelatin test

The extract (50 mg) is dissolved in 5 ml of distilled water and 2 ml of 1% solution of Gelatin containing 10% NaCl is added to it. White precipitate indicates the presence of phenolic compounds (6).

c. Lead acetate test

The extract (50 mg) is dissolved in of distilled water and to this 3 ml of 10% lead acetate solution is added. A bulky white precipitate indicates the presence of phenolic compounds.

d. Alkaline reagent test

An aqueous solution of the extract is treated with 10% ammonium hydroxide solution. Yellow fluorescence indicates the presence of flavonoids.

e. Magnesium and Hydrochloric acid reduction

The extract (50 mg) is dissolved in 5 ml of alcohol and few fragments of magnesium ribbon and concentrated hydrochloric acid (drop wise) are added. If any pink to crimson colour develops, presence of flavonol glucosides is inferred (10).

6. Test for Proteins

The extract (100 mg) is dissolved in 10 ml of distilled water and filtered through Whatmann No. 1 filter paper and the filtrate is subjected to test for proteins.

a. Millon's test

To 2 ml of filtrate few drops of Millon‟s reagent are added. A white precipitate indicates the presence of proteins (11).

b. Biuret test

2 ml of filtrate is treated with 1 drop of 2% copper sulphate solution. To this 1 ml of ethanol (95%) is added, followed by excess of potassium hydroxide pellets. Pink colour ethanolic layer indicates the presence of protein (12).

7. Test for Saponins

The extract (50 mg) is diluted with distilled water and made up to 20 ml. The suspension is shaken in a graduated cylinder for 15 minutes. A two cm layer of foam indicates the presence of saponins (7).

RESULT

Phytochemical analysis

Chemicals like Phytosterols and triterpenes are present in the plant along with β-sitosterol, γ-sitosterol, campesterol, fucosterol and sitostanol. Also most of the abundant constituents also were detected in the plant extract of Girardinia diversifolia. By isolated and conducting 1D and 2D NMR it is confirm the structure of γ-sitosterol (13,14).

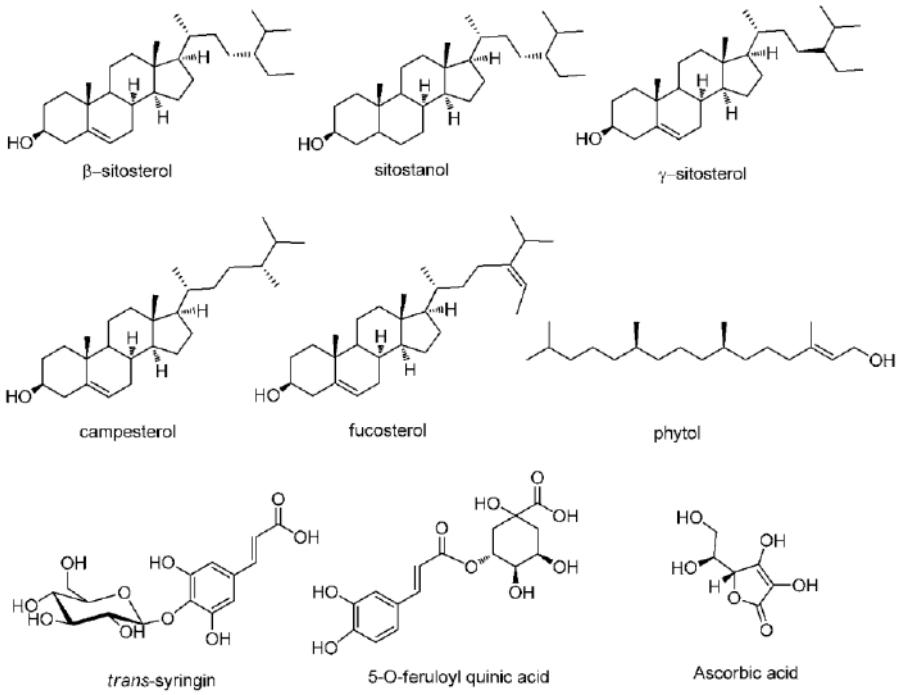

Figure 1. Some Structure of Phytochemicals Present in Girardinia diversifolia

In comparison with the reference standard, a low amount of β-carotene and zeaxanthin were detected, while other derivatives that were assigned to oxidized products of carotenoids, mostly β-carotene epoxide, were observed and tentatively identified on the basis of their MS spectra and comparison with the literature (15). Some organic acids, namely citric and quinic acids were also detected (16).

CONCLUSION

Girardinia diversifolia is a very important medicinal plant which have no harmful effect to human and it has various pharmacological properties like antioxidant, hepatoprotective, antimicrobial, etc. The plant have lots of active chemical constituents like phenols, flavonoids, ascorbic acid, lipids, starch, glycosides, and many other compounds. This plant needs to be explore more to find out more benefits and medicinal use of Girardinia diversifolia.

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HOW TO CITE: Anit Kumari, Dev Prakash Dahiya, Chinu Kumari, Munish Choudhary, Pratibha Rana, Dinesh Kumar, Morphology and Phytochemical analysis of Plant *Girardinia diversifolia* also known as BichuButi, Int. J. of Pharm. Sci., 2024, Vol 2, Issue 7, 909-914. https://doi.org/10.5281/zenodo.12737912