Evaluation Of Preliminary Phytochemical Screening Of *Passiflora Foetida* Linn

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Abstract:
The present study aims to evaluate the preliminary phytochemical screening of Passiflora foetida Linn. (Passion fruit) to identify the bioactive compounds responsible for its therapeutic properties. Phytochemical analysis was conducted on various extracts of Passiflora foetida fruit using standard procedures to detect the presence of alkaloids, flavonoids, saponins, tannins, terpenoids, and other secondary metabolites. The results indicated that Passiflora foetida extracts contained a wide range of bioactive compounds, including flavonoids, alkaloids, saponins, tannins, and phenolic compounds, all of which are known for their antioxidant, anti-inflammatory, and antimicrobial activities. The presence of these phytochemicals highlights the potential of Passiflora foetida as a valuable source of natural therapeutic agents. This preliminary phytochemical screening provides a foundation for further studies on the pharmacological activities of Passiflora foetida and its potential applications in medicine.

Keywords: *Passiflora foetida*, Phytochemical screening, Bioactive compounds, secondary metabolites.

Introduction:

Passiflora foetida Linn., commonly known as wild passion fruit, is a species of the Passifloraceae family, found primarily in tropical and subtropical regions. This plant has been traditionally used in various cultures for its medicinal properties, which include its potential to treat a variety of ailments such as inflammation, pain, fever, and even wounds. The bioactive compounds present in Passiflora foetida, such as alkaloids, flavonoids, saponins, and tannins, are believed to contribute to its therapeutic effects.

Phytochemical screening is an essential tool for identifying the chemical constituents in plants that may have medicinal value. By systematically evaluating the presence of secondary metabolites, such as flavonoids, terpenoids, alkaloids, tannins, and saponins, phytochemical analysis can provide valuable insights into the pharmacological potential of a plant. These compounds are known to exhibit a wide range of biological activities, including antioxidant, anti-inflammatory, antimicrobial, and antidiabetic effects.

The current study aims to perform a preliminary phytochemical screening of Passiflora foetida Linn. to identify and characterize its key bioactive components. This information is crucial for further exploration of the plant's therapeutic potential, as well as for its use in the development of natural remedies. By understanding the phytochemical profile of Passiflora foetida, we can lay the foundation for future research into its pharmacological properties and potential applications in modern medicine.

Materials and method

Collection and authentication of plant material

The leaves of Passiflora foetida Linn. (Poaceae) was collected from local area.

Drying and size reduction

The plant parts of the selected plant were dried by exposing to sunlight for about a week followed by drying at 30°C-35°C in an oven for 8 hours. The dried plant materials were pulverized mechanically to a coarse powder passed through sieve no. 40. This powdered material was again dried in an oven at 30°C-35°C for an hour and stored in an airtight container until further studies.

Chemicals

Chloral hydrate, fehling solution A & B, picric acid, and sodium hydroxide were purchased from Merck specialities Pvt. Ltd., Mumbai; acetonitrile, nitric acid, α-napthol, chloroform, petroleum ether (40-60°C), toluene, ethanol, methanol, ethyl acetate, hydrochloric acid, sulphuric acid, and nitric acid were purchased from RFCL Ltd., New Delhi; lead acetate, perchloric acid, potassium bismuth iodide, potassium mercuriciodide, potassium iodide, sodium bicarbonate, sodium carbonate, and glacial acetic acid were purchased from Qualigens fine chemicals, Mumbai; antimony trichloride, ferric chloride, trichloroacetic acid,and sodium nitroprusside were purchased from Hi Media laboratories Pvt. Ltd., Mumbai; millon's reagent, and ninhydrin reagent were purchased from CDH Pvt. Ltd., New Delhi; anisaldehyde was purchased from Loba Chemie, Mumbai. All the other chemicals and reagents used were of analytical grade.

Preparation of extracts

Plant material obtained from *Passiflora foetida*Linn were shade dried and coarsely powdered. Powdered material (1000 mg) of each selected plant part was extracted successively with solvents i.e. petroleum ether (40-60°C), chloroform, ethyl acetate, ethanol and purified water using soxhlation (Anonymous, 2008).

The extracts were concentrated using rotary vacuum evaporator, dried in desiccators and stored in the airtight containers inside a refrigerator; until used.

Preliminary phytochemical screening

The extracts obtained from successive soxhlation of powdered leaves of plant prepared by using petroleum ether (40-60°C), chloroform, ethyl acetate, ethanol and water were subjected to qualitative phytochemical tests for the presence of glycosides, alkaloids, sterols, carbohydrates, phenolic compounds, tannins, flavonoids, saponins, proteins and amino acids (Farnsworth NR, 1966; Kokate CK, 1994; Harborne JB, 1998).

Test for alkaloids

Approximately500 mg of each of the dried extract was agitated with about 5 ml of dilute hydrochloric acid and then filtered. The obtained filtrate was tested with the following reagents:

1. **Mayer's reagent:** Few drops of potassium mercuric iodide solution (Mayer's reagent) were added to each filtrate separately and the formation of white or cream coloured precipitate was observed.
2. **Dragendorff's reagent:** 1-2 drops of a solution of potassium bismuth iodide (Dragendorff's reagent) were added to each filtrate separately and the formation of orange-yellow precipitate was observed.
3. **Hager's reagent:** 1-2 drops of a saturated aqueous picric acid solution was added to the filterate, yellow precipitates were observed.
4. **Wagner's reagent:** Few drops of a solution of iodine in potassium iodide (Wagner's reagent) were added to each filtrate separately and the formation of the reddish brown precipitate was observed.

Test for flavonoids

1. **Ammonia test:** A few milligrams of the extract was dissolved in water and filtered. Filter paper strip was dipped in the filtrate and ammoniated. Yellow colouration of the filter paper strip indicates the presence of flavonoids.
2. **Shinoda test:** A few milligrams of the extract was dissolved in water and filtered. To the filtrate, a piece of metallic magnesium/zinc was added followed by the addition of 2 drops of concentrated hydrochloric acid. The appearance of reddish brown colour indicates the presence of flavonoids in all the extracts.

Test for glycosides

1. **Keller-Killiani test:** 1 ml of glacial acetic acid containingtraces of ferric chloride and 1 ml of concentrated sulphuric acid was added to extracts carefully. The appearance ofred colour indicates the presence of glycosides.
2. **Sodium nitroprusside test:** The extracts were made alkaline with few drops of 10% sodium hydroxide and then freshly prepared sodium nitroprusside solution was added. Blue colour indicates the presence of glycosides in the extracts.
3. **Borntrager's test:** Appearance of pink colour, when 1 ml of benzene and 0.5 ml of dilute ammonia solution were added to extracts indicates the positive test for glycosides.

Test for sterols

1. **Liebermann-Burchard test:** A few milligrams of the extract were dissolved in chloroform and 2 ml of acetic anhydride was added, followed by 2 drops of concentrated sulphuric acid along the sides of the test tube. The appearance of blue to green colour indicates the presence of sterols in the extract.
2. **Salkowski test:** Sulphuric acid (2 ml) was added to a few milligrams of residue taken in 2 ml of chloroform. The appearance of a yellow ring at the junction which turns red after 1 min. indicates the presence of sterols in the extract.

Test for phenolic compounds and tannins

A few milligrams of the extract were mixed with 5 ml of distilled water, filtered and to the filtrate following tests were performed.

1. **Ferric chloride test:** Formation of blue-green colour on addition of ferric chloride solution (1% w/v) was taken as a positive test for phenolic compounds.
2. **Lead acetate test:** Addition of few drops of lead acetate solution (10% w/v) to the aqueous extract gives a yellow/white precipitate, suggesting the existence of phenolic compounds/tannins.

Test for saponins

1. **Foam test:** To the few milligrams of the extract, a few drops of water were added and shaken well. Formation of foam indicates the presence of saponins.
2. **Sodium bicarbonate test:** To the few milligrams of extract, few drops of sodium bicarbonate were added and shaken well. Formation of honey comb like frothing indicates a positive test for saponins.

Test for proteins and free amino acids

To few milligrams of residue, 5 ml of distilled water was added and filtered. Filtrate was then subjected to the following tests:

1. Millon's test: To 2 ml of the filtrate, 5-6 drops of Millon's reagent (solution of mercurynitrate and nitrous acid) were added. The appearance of red precipitate indicates the presence of proteins and free amino acids.

2. Ninhydrin test: To the filtrate, lead acetate solution was added to precipitate tannins and filtered. The filtrate was spotted on a paper chromatogram, sprayed with ninhydrin reagent and dried at 110°C for 5 minutes. Violet spots (free amino acids) confirmed the presence of proteins/free amino acids.

Test for carbohydrates

1. **Molisch's test:** A few milligrams of the extract was dissolved in water and filtered. To the filtrate, few drops of α-naphthol (20% in ethyl alcohol) were added. Then about 1 ml of concentrated sulphuric acid was added along the side of the tube, reddish violet ring at the junction of two layers was seen, indicates the presence of carbohydrates.

2. **Fehling's test:** 1 ml of the filtrate was boiled on a water bath with 1 ml each of Fehlingsolution A and B. Appearance of a green suspension and red precipitate indicates the presence of carbohydrates.

Results and discussion

PercentageYield

The successive extracts of powdered roots and seeds of selected plants prepared by using petroleum ether (40-60°C), chloroform, ethyl acetate, ethanol and water by following the procedure mentioned in materials and methods.

Table 1: Successive extracts yield values of the *leaves of Passiflora foetida* L.,

S. No.	Solvent used	Percentage Yield(w/w)
		Passiflora foetida leaves
1	Petroleumether(40-60°C)	0.62±0.82
2	Chloroform	3.15±0.78
3	Ethylacetate	1.13±0.97
4	Ethanol	9.84±0.61
5	Aqueous	12.50±0.45

Values are mean±S.E.M.;n=3

Preliminary phytochemical screening

Preliminary phytochemical screening provides information about the presence of the phytoconstituents in the extracts. The successive extracts of *Passiflora foetida* L. were tested for preliminary phytochemical screening according to the procedure mentioned in materials and method.

Table1 : Phytochemical screening of different extracts of *Passiflora foetida* L leaves.

S. No.	Chemical Test	Petrole um ether extract	Chloroform extract	Ethyl acetate extract	Ethanol extract	Aqueous extract
1	**Alkaloids** Dragondorff'stest Hager's	-ve	+ve	-ve	-ve	-ve
	test Mayer'test Wagner'stest	-ve	-ve	-ve	-ve	-ve
		-ve	+ve	-ve	-ve	-ve
		-ve	+ve	-ve	-ve	-ve
2	**Carbohydrates** Benedict's test Fehling	-ve	-ve	-ve	-ve	+ve
	test	-ve	-ve	-ve	-ve	+ve
	Molisch'stest	-ve	-ve	-ve	-ve	+ve
3	**Glycosides**	-ve	-ve	-ve	+ve	+ve
	Killer Killani test Sodiumnitroprusside	-ve	-ve	-ve	+ve	+ve
	Test					
4	**AnthraquinoneGlycosides**					
	Borntrager'stest	-ve	-ve	-ve	+ve	+ve
	ModifiedBorntrager'stest	-ve	-ve	-ve	+ve	+ve
5	**Steroids**	+ve	+ve	-ve	-ve	-ve
	Hesse's test LiebermanBurchard's test	+ve	+ve	-ve	-ve	-ve
	Salkowskitest	+ve	+ve	-ve	-ve	-ve
6	**Flavonoids**	-ve	-ve	+ve	+ve	+ve
	Ammoniatest Shinoda test	-ve	-ve	+ve	+ve	+ve
7	**Saponins**	-ve	-ve	-ve	-ve	+ve
	Foamtest					
8	**Freeaminoacids**	-ve	-ve	-ve	-ve	-ve
	Millon's test Ninhydrintest	-ve	-ve	-ve	+ve	+ve

9	**Phenolics&Tannins** Ferricchloride LeadAcetate	-ve -ve	-ve -ve	-ve -ve	-ve +ve	+ve +ve
10	**Starch** Iodinetest	-ve	-ve	-ve	-ve	+ve

+ve-Present,-ve- Absent

The preliminary phytochemical screening of the successive extracts of selected plant species, viz. petroleum ether (40-60°C), chloroform, ethyl acetate, ethanol, and aqueous extract, confirmed the presence of carbohydrates, glycosides, alkaloids, sterols, phenolics and tannins, saponins, flavonoids, and amino acids. The phytochemical findings of the study confirm the presence of plant phenolics, flavonoids, and other secondary metabolites, which are currently of growing interest owing to their functional properties in promoting human health (Pullaiah T and Chandrasekhar NK, 2003). Flavonoids and other plant phenolics act as remedies in the treatment of stress-related ailments and as dressings for wounds, cuts, rheumatism, etc. (Havsteen B, 1983).

Conclusion:

The preliminary phytochemical screening of *Passiflora foetida* L. extracts revealed the presence of several bioactive compounds across the different solvents used for extraction. The petroleum ether, chloroform, ethyl acetate, ethanol, and aqueous extracts displayed distinct profiles of phytoconstituents.

Among the extracts, the ethanol and ethyl acetate extracts showed the most comprehensive presence of bioactive compounds, including glycosides, flavonoids, and phenolics. The aqueous extract also demonstrated the presence of carbohydrates, glycosides, and saponins, while the petroleum ether and chloroform extracts showed fewer phytoconstituents, indicating their selective solubility for specific compounds.

Alkaloids, a significant class of bioactive compounds, were absent in all the extracts, indicating that *Passiflora foetida* may not be a significant source of these compounds. Conversely, the presence of flavonoids and phenolics, particularly in the ethyl acetate and ethanol extracts, suggests their potential role in the plant's therapeutic properties, including antioxidant and anti-inflammatory effects. Saponins, known for their antimicrobial and anti-inflammatory properties, were present in the aqueous extract, supporting the plant's medicinal potential in treating various ailments.

Overall, the findings suggest that *Passiflora foetida* L. is a promising source of natural bioactive compounds, particularly flavonoids, glycosides, and phenolics, which may contribute to its therapeutic benefits. Further studies are recommended to explore these compounds in greater detail and to evaluate their pharmacological activities for potential medicinal applications.

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