Studies on Quality Control and Standardization Parameters of roots of Passiflora foetida Linn

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Abstract

For the treatment of various disorders, almost 80% of the Indian population relies on traditional medicine. As more people rely on herbal plants, it is important to properly screen out any products made from such plants that don't meet certain quality criteria. Traditional medicine has utilised Passiflora foetida, often known as stinking passion flower, to treat conditions like throat infections, giddiness, liver problems, diarrhoea, tumours, neurological disorders, anxiety, sleep disorders, skin infections, hysteria, and asthma. Additionally, it has been suggested that P. foetida may possess anti-cancer, anti-inflammatory, antiepileptic, anti-hyperglycemic, cardioprotective, anti-antioxidant, and anti-inflammatory effects. Among the identified metabolites from this plant, flavonoids, polysaccharides, -pyrones, and cyanohydrins predominate. The leaves, stems, seeds, resins, and fruits have all been used to isolate the chemicals. Passiflora foetida Linn. roots were assessed for quality criteria in the current investigation. Various standardisation parameters were investigated and reported on in this study.

Key Words: Passiflora foetida, Standardization Parameters, Quality Control

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Introduction

The medical system relies heavily on medicinal plants and their extracts to maintain our health. India is a medically varied nation where the traditional medical systems of Ayurveda, Homoeopathy, and Unani value the variable origins of therapeutic plant extracts. [1-2] Passiflora sp. is one of the 2000 recognised medicinal plants that are utilised throughout the system. Many Passiflora species have been used therapeutically, but only a few, including the rare Passiflora foetida, have been called "passion flowers" and used to treat conditions like anxiety, sleeplessness, convulsions, sexual dysfunction, coughing, and even cancer. [3-5] So, far no any systematic study was carried out in evaluating the standardization parameters of roots of selected plant, therefore, the present work was undertaken to revel and develop the quality control parameters for standardization of selected herb.

Material and Methods

Selection, Collection and authentication of herb

The roots of *Passiflora foetida* Linn. was collected from local area of Indore and was identified & authenticated by Botanist.

Physicochemical Evaluation of herb

The dried parts were subjected to standard procedure for the determination of various physicochemical parameters. [6-8]

Determination of foreign organic matter (FOM)

Accurately weighed 100 g of the drug sample and spread it out in a thin layer. The foreign matter should be detected by inspection with the unaided eye or by the use of a lens (6X). Separate and weigh it and the percentage present was calculate.

Determination of moisture content (LOD)

Place about 10 g of drug (without preliminary drying) after accurately weighing in a tared evaporating dish and kept in oven at 105^0 C for 5 hours and weigh. The percentage loss on drying with reference to the air dried drug was calculated.

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Determination of ash value

The determination of ash values is meant for detecting low-grade products, exhausted drugs and sandy or earthy matter. It can also be utilized as a mean of detecting the chemical constituents by making use of water-soluble ash and acid insoluble ash.

Total ash

Accurately about 3 gms of air dried powder was weighed in a tared silica crucible and incinerated at a temperature not exceeding 450^{0}C until free from carbon, cooled and weighed and then the percentage of total ash with reference to the air dried powdered drug was calculated. The percentage of total ash with reference to the air-dried drug was calculated.

Acid insoluble ash

The ash obtained in the above method was boiled for 5 minutes with 25ml of dilute HCl. The residue was collected on ash less filter paper and washed with hot water, ignited and weighed. The percentage of acid insoluble ash was calculated with reference to the air dried drug.

Water soluble ash

The ash obtained in total ash was boiled for 5 minutes with 25 ml of water. The insoluble matter was collected on an ash less filter paper, washed with hot water and ignited to constant weight at a low temperature. The weight of insoluble matter was subtracted from the weight of the ash. The difference in weights represents the water soluble ash. The percentage of water soluble ash with reference to the air dried drug was calculated.

Determination of swelling index

Swelling index is determined for the presence of mucilage in the seeds. Accurately weigh 1 g of the seed and placed in 150 ml measuring cylinder, add 50 ml of distilled water and kept aside for 24 hours with occasional shaking. The volume occupied by the seeds after 24 hours of wetting was measured.

Determination of extractive value

This method determines the amount of active constituents extracted with solvents from a given amount of medicinal plant material. It is employed for materials for which as yet no suitable chemical or biological assay exists.

Cold maceration

Place about 4.0g of coarsely powdered air-dried material, accurately weighed, in a glass-stoppered conical flask. Macerate with 100ml of the solvent specified for the plant material concerned for 6 hours, shaking frequently, then allow to stand for 18 hours. Filter rapidly taking care not to lose any solvent, transfer 25 ml of the filtrate to a tared flat-bottomed dish and evaporate to dryness on a water bath. Dry at 105°C for 6 hours, cool in a desiccator for 30 minutes and weigh without delay. Calculate the content of extractable matter in mg per g of air dried material. For ethanol-soluble extractable matter, use the concentration of solvent specified in the test procedure for the plant material concerned; for water-soluble extractable matter, use water as the solvent.

Extraction of selected herb

Sample were shattered and screened with 40 mesh. The shade dried coarsely powdered plant material (250gms) were loaded in Soxhlet apparatus and was extracted with ethanol until the extraction was completed. After completion of extraction, the solvent was removed by distillation. The extracts were dried using rotator evaporator. The residue was then stored in dessicator and percentage yield were determined. [9-10]

Preliminary phytochemical screening of extract

The various extract obtained after extraction were subjected for phytochemical screening to determine the presence of various phytochemical present in the extracts. The standard procedures were adopted to perform the study. [9-10]

Tests for carbohydrates

Molisch's test

To the Sample 2-3 drops of 1% alcoholic - napthol solution and 2 ml of conc. sulphuric acid was added along the sides of the test tube. Appearance of purple to violet ring at the junction of two liquids shows the presence of carbohydrates.

Fehling test

To the sample add fehling reagent, appearance of brick red precipitate shows presence of carbohydrates.

Test for glycosides

Legal's test

To the sample add 1 ml of pyridine and few drops of sodium nitropruside solutions and then it was made alkaline with sodium hydroxide solution. Appearance of pink to red colour shows the presence of glycosides.

Borntrager's test

Sample was treated with chloroform and then the chloroform layer was separated. To this equal quantity of dilute ammonia solution was added. Ammonia layer acquires pink color, showing the presence of glycosides.

Baljet's test

To the sample add picric acid, orange color shows presence of glycosides.

Test for alkaloids

A small portion of the sample was stirred separately with few drops of dilute hydrochloric acid and was tested with various reagents for the presence of alkaloids. The reagents are

- Dragendroff's reagent - Reddish brown precipitates
- Wagner;s reagent - Reddish brown precipitates
- Mayer's reagent - Cream color precipitates
- Hager's reagent - Yellow color precipitate

Test for proteins and free amino acids

Small quantities of the sample was dissolved in few ml of water and treated with following reagents.

- Million's reagent: Appearance of red color shows the Presence of protein and free amino acid.
- Ninhydrin reagent: Appearance of purple color shows the Presence of Proteins and free amino acids.
- Biuret's test: Equal volumes of 5% sodium hydroxide solution & 1% copper sulphate solution was added. Appearance of pink or purple color shows the presence of proteins and amino acids.

Test for tannins and phenolic compounds

A small quantity of the sample was taken separately in water and test for the presence of phenol compounds and tannins was carried out with the following reagents.

- Dilute Ferric chloride solution (5%) - Blue color or green color
- 10% lead acetate solution - White precipitates

Test for flavonoids

Alkaline reagent test

To the test solution add few drops of magnesium hydroxide solution, intense yellow colour is formed which turns to colourless on addition of few drops of dilute acid indicates presence of flavonoids.

Shinoda's test

Small quantities of the sample was dissolved in alcohol, to them piece of magnesium followed by conc. hydrochloric acid drop wise added and heated. Appearance of pink, crimson red, green to blue color shows the presence of flavonoids**.**

Tests for fixed oils and fats

Spot test

A small quantity of sample was separately pressed between two filter papers. Appearance of oil stain on the paper indicates the presence of fixed oil.

Saponification test

Few drops of 0.5 N alcoholic potassium hydroxide were added to a small quantity of sample along with a drop of phenolpthlein, the mixture was heated on a water bath for 1-2 hours, formation of soap or partial neutralization of alkali indicates the presence of fixed oils and fats.

Tests for steroids and triterpenoids

Libermann-burchard test

Treat the sample with few drops of acetic anhydride, boil and cool. Then add con. sulphuric acid from the side of test tube, brown ring is formed at the junction two layers and upper layer turns green which shows presence of steroids and formation of deep red colour indicates presence of triterpenoid.

Salkowski test

Treat the sample with few drop of conc. sulphuric acid, red colour at lower layer indicates presence of steroids and formation of yellow coloured lower layer indicates presence of triterpenoids.

Test for mucilage and gums

- Small quantities of sample was added separately to 25 ml of absolute alcohol with constant stirring and filtered. The precipitates was dried in oil and examined for its swelling property for the presence of gum and mucilage.
- To the sample add ruthenium red solution, pink color shows presence of mucilage.

Test for waxes

To the test solution add alcoholic alkali solution, waxes get saponified.

Results and Discussion

The roots of *Passiflora foetida* were collected from Indore District of Madhya Pradesh, India and identified morphologically and compared with standard pharmacopoeial monograph. The collected plant material was dried and the powdered plant material was used further to reveal various parameters. The dried plant part was subjected to standard procedure for the determination of various physicochemical parameters. The results were presented in table 1. The shade dried coarsely powdered plant materials were extracted with ethanol. The extracts obtained were evaluated for pH, color and % yield. The results are presented in table 2. The phytochemical screeing of all ethanolic extract were performed and the results were shown in table 3.

Table 1: Physicochemical Evaluation of roots of Passiflora foetida Linn.

S/No.	Parameters	PFR
1.	FOM	1.10
2.	LOD	0.65
3.	TA	8.3112
4.	AIS	1.0120
5.	WSA	3.0422
6.	SI	0.82
7.	WSEV	7.1482
8	ESEV	6.2842

Note: All values are expressed as Mean, n=3

Table 2: Estimation of % yield of ethanolic extract of roots of Passiflora foetida Linn.

S/No.	Extract	Parameters			
		Nature of Extract	Color	pH	% Yield (w/w)
1.	EEPFR	Solid Powder	Cream	7.1	4.32

Table 3: Preliminary phytochemical screening ethanolic extract of roots of Passiflora foetida Linn.

S/No.	Extract	Phytochemicals									
		Carbohydrates	Glycosides	Alkaloids	Protein & Amino acid	Tannins & Phenolic compounds	Flavonoids	Fixed oil and Fats	Steriods & Triterpenoids	Waxes	Mucilage & Gums
1.	EEPFR	+	+	+	-	-	-	-	+	-	-

Abbr.: + = Present; - = Absent

Conclusion

Assessment of quality control and standardization parameters of the medicinal plants is of great interest and importance in order to reveal quality, safety and efficacy of medicinal plants. The roots were estimated for the presence of LOD. FOM, SI, TA etc and were found in limit. The percentage of ethanolic extract was found to be 4.32 % w/w. Preliminary phytochemical process revealed the presence of Carbohydrates, glycosides, alkaloids, Steriods & Triterpenoids in the ethanolic extract.

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