



PHARMACOGNOSTICAL, PHYTOCHEMICAL STUDIES OF THE LEAVES OF *PASSIFLORA QUADRANGULARIS* L

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ABSTRACT

The plant *Passiflora quadrangularis* L. also known as giant granadilla is a perennial climber native to the Neotropics. It produces largest fruit of this family. The plant is also grown as an ornamental plant. The plant is used in various disease conditions like antioxidant, antibacterial, sedative, etc. Here the pharmacognostical studies of transverse section, powder microscopy, physicochemical studies were carried out. Successive solvent extraction is done and phytochemical studies were done with the extract. Various chemical tests were carried out and it shows the presence of flavonoids, carbohydrates, etc.

KEYWORDS: *Passiflora quadrangularis*, Pharmacognostical study, Phytochemical study.

1. INTRODUCTION

Passiflora quadrangularis L. is also known as giant granadilla, barbadine, is a tropical or subtropical perennial climber native to South America. It belongs to the family Passifloraceae. The plant produces largest fruit of this family. The fruits are edible. The plant is also grown for ornamental purpose. It has large purplish flowers. Fruits are light green in colour. The plant is used to lower the blood pressure and blood glucose level. Also used as antibacterial, antioxidant, sedative, etc. The antibacterial activity of *Passiflora quadrangularis* L. was studied by disc diffusion method. The total phenolic content of the plant is determined using the Folin-Ciocalteu method. DPPH radical scavenging assay is used to determine the antioxidant activity of the plant.^[1]

2. MATERIALS AND METHODS

2.1 Plant collection and authentication

The plant was collected from Rajankavala, Kottayam district of Kerala. The collected plant was dried under shade. The dried leaves were crushed and powder. Then it was sieved by using mesh of size 40. This plant powder is stored in well closed plastic containers at room temperature. This is used to carry out further studies.

The herbarium specimen of *Passiflora quadrangularis* L. were prepared by pressed and processed following standard practices.^[2] The herbarium is authenticated by Dr. Stephen Sequeira M. Sc, Ph.D., Postgraduate Department of Botany, Maharajas College, Ernakulam.

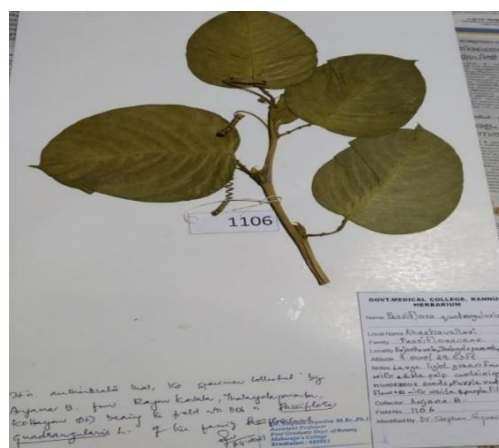


Fig 1: Herbarium of *Passiflora quadrangularis* L.

2.2 Pharmacognostical studies

2.2.1 Macroscopic evaluation

Macroscopical studies of the leaves of *Passiflora quadrangularis* L. were examined and described by the evaluation of external characters like colour, taste, odour, surface and phyllotaxy.

2.2.2 Microscopical studies

Transverse section of the leaf was taken. First a mature leaf was selected. Then its midrib portion was cut for took the transverse section. Then it was boiled in chloralhydrate solution in order to remove the chlorophyll. Then it was stained using phloroglucinol and HCl. Then it is observed through 10X.^[3,4]

Dried powder of the leaf was taken and stained with phloroglucinol and HCl and observed through a microscope at 40X.

2.2.3 Physicochemical evaluation

Various physicochemical parameters like ash values, extractive values, moisture content, foaming index, swelling index, mucilage content, etc. are carried out according to the procedure.^[4]

2.2.4 Phytochemical studies

Successive solvent extraction was carried out with

various solvents according to the polarity. The solvents used are petroleum ether, chloroform, ethyl acetate, ethanol.^[5] Then preliminary phytochemical analysis was carried out. Phytochemical screening of various extracts of *Passiflora quadrangularis* L. was carried out by qualitative chemical tests.^[6,7]

3. RESULTS AND DISCUSSION

3.1 Macroscopic evaluation

The colour and type of leaves were determined from the results obtained from the macroscopical evaluation.

Table 1: Organoleptic analysis of leaves of *Passiflora quadrangularis* L.

Colour	Surface	Phyllotaxy	Type	Margin	Venation
Dark green	Glabrous	Simple	Orbiculate	Entire	Reticulate

3.2 Microscopic evaluation

Various microscopic characters of the leaves of *Passiflora quadrangularis* L. were studied.

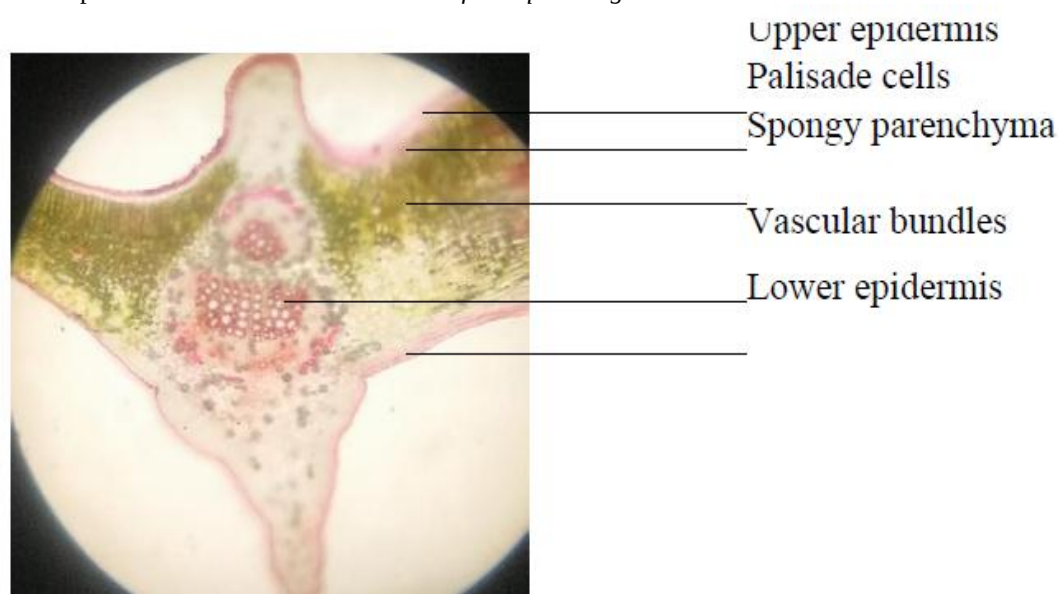


Fig 2: Transverse section of *Passiflora quadrangularis* L. leaf.



Fig 3: Vascular bundle

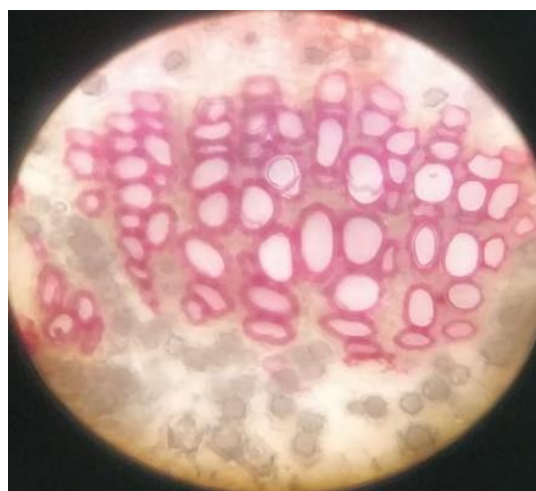


Fig 4: Enlarged view of vascular bundle and tannin cells.



Fig 5: Stomata



Fig 6: Trichomes

3.2.1 Epidermis

Transverse section of leaf shows distinct upper and lower epidermis. The epidermis of both the structure is single layered. The epidermis is thick with large elliptical or rectangular walled cells. Lower epidermis is comparatively thin. The leaves were higher in lower surface.

3.2.2 Stomata

Stomata are anamocytic.

3.2.3 Trichomes

Glandular trichomes are present.

3.2.4 Mesophyll

Mesophyll layer can be differentiated in to two layers. That is palisade tissues and spongytissues.

3.2.4.1 Palisade tissue

Palisade tissue is made up of elongated cells with chloroplast.

3.2.4.2 Spongy tissue

Spongy parenchyma cells are rectangular shaped and compact.

3.2.5 Vascular bundles

Vascular bundles are many. Collateral and xylem elements are facing towards the centre.

3.3 Powder microscopy

The powder microscopy of *Passiflora quadrangularis L.* shows following parts.



Fig7: Spiral xylem vessel

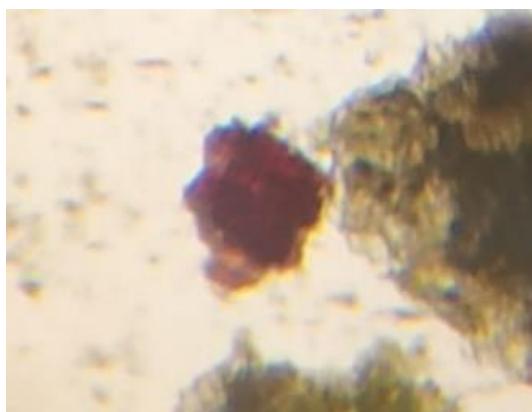


Fig 8: Cristal



Fig 9: Tracheids

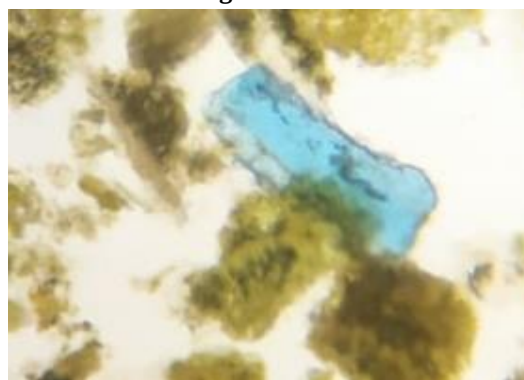


Fig10: Vessel element

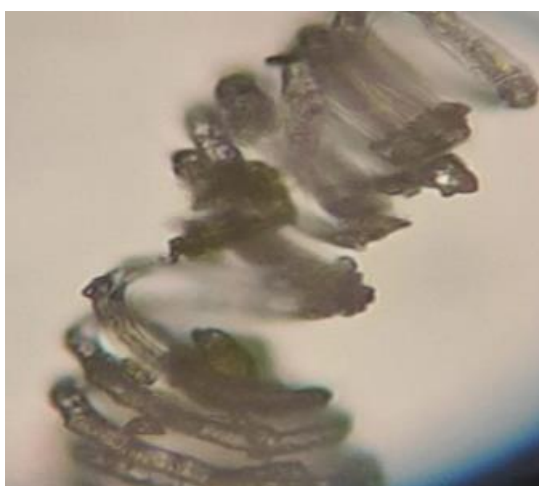


Fig 11: Spiral vessel



Fig 12: Star shaped trichome



Fig 13: Vessel element.

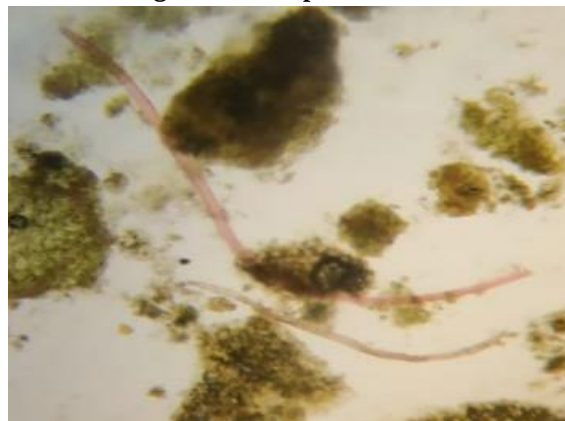


Fig 14: Sclerenchymatous fibre.

3.4 Physicochemical characters

For detecting the adulteration and conform the purity various physicochemical characters can be determined.

The presence and absence of foreign matters like metallic salts and silica can be detected by detecting the ash values.

Table 2: Physicochemical evaluation of *Passiflora quadrangularis* L.

Parameter	Value (%w/w)
Moisture content	3
Total ash	14.5
Acid insoluble ash	4
Water soluble ash	2.5
Sulphated ash	6.25
Nitrated ash	5
Water soluble extractive	6.8
Ethanol soluble extractive	16.2
Non volatile ether soluble extractive	5.5
Mucilage content	6.8
Swelling index	0.6 ml
Foaming index	111ml

3.5 Phytochemical studies

Successive solvent extraction was carried out. Then the preliminary phytochemical analysis was carried out using this extract.

Table 3: Colour, Consistency and yield of each extract.

Solvent	Colour and Consistency	% Yield
Petroleum ether	Dark greenish black (stickysemisolid)	4
Chloroform	Dark brownish green (stickysemisolid)	3.5
Ethyl acetate	Dark olive green (stickysemisolid)	3
Ethanol	Dark green (stickysemisolid)	18.75

Phytochemical screening showed the presence of various compounds, mucilage and flavonoids. constituents like carbohydrates, saponins, phenolic

Table 4: phytochemical tests in different extracts.

Test	Petroleum ether	Chloroform	Ethyl acetate	Ethanol	Water
Alkaloids	-	-	-	-	-
Carbohydrate	-	-	-	+	+
Phytosterols	-	-	-	-	-
Fat and oil	-	-	-	-	-
Saponins	-	-	-	-	+
Phenolic compounds	-	-	+	+	+
Mucilage	+	-	-	-	-
Flavonoids	-	-	-	+	+

Qualitative test in petroleum ether extract shows only the presence of mucilage. Presence of no chemical contacts were found in chloroform extract. Ethyl acetate extract shows the presence of phenolic compounds. Carbohydrate, phenolic compounds and flavonoids were found in ethanolic extract. Aqueous extract shows the presence of carbohydrate, saponins, phenolic compounds and flavonoids.

4. CONCLUSION

Here the study includes the pharmacognostical and phytochemical characters of the leaves of the plant *Passiflora quadrangularis* L. Macroscopy and microscopy of leaf of the plant were examined. Phytochemical studies were revealing the presence of various chemical constituents.

5. ACKNOWLEDGEMENT

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