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Physico-chemical, Phytochemical and Spectroscopic Studies on *Passiflora foetida* L.

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ABSTRACT

The usage of medicinal plants in the field of public health has a vital role in India. Passiflora foetida L commonly known as 'stinking passion flower' plant is widely used in indigenous medicine system and also by traditional healers for various ailments. The present study scientifically documents the physico-chemical, phytochemical and spectroscopic characteristics of this plant using various techniques. The study helps to understand the medicinal importance of this plant based on their phytoconstituents and spectroscopic studies.

Keywords: *Physico Chemical Studies, Passiflora foetida, Spectroscopic Analysis, Phytochemical Characteristics.*

INTRODUCTION

India is one of the major countries mainly depending on the medicinal plants for the primary health care of the people. Plants are used extensively for the medicine purpose through out the world as they contain various phytochemicals. Plants are the rich source of bioactive compounds and used by the chemical industries and modern pharmaceutical industries for extraction various useful molecules [1,2].

The traditional medicine systems of India such as Ayurveda and Siddha exponentially bring out the preventive and therapeutic approach using medicinal plants and their extracts. The plant *Passiflora foetida* L. commonly known as 'Passion flower plant" or "Stinking passion flower" is indigenous to Mexico, Caribbean and Central America. The fruit of this plant is used in tropical and subtropical countries as edible fruit and plant is used for ornamental purposes [3,4]. The present study brings out the physico-chemical and phytochemical characteristics of the plant and documents the spectroscopic analysis of various extracts of leaf.

Taxonomical Classification [5]

Domain: Eukaryota
Kingdom: Plantae
Phylum: Spermatophyta
Subphylum: Angiospermae
Class: Dicotyledone
Order: Violales
Family: Passifloraceae
Genus: Passiflora
Species: *Passiflora foetida*.
Vernacular names
Love in Amidst - English
Siruppunaikkali- Tamil
Poochapazham, Akasatondi- Malayalam
Kukkiballi– Kannada

MATERIALS AND METHODS

Plant Collection and Authentication

The fresh plant materials were collected from the Nila River regions of Palakkad District, Kerala, India. The collected plant materials were authenticated by the taxonomist, from Kerala Forest Research Institute, (Research Institute underGovernment of Kerala), Thrissur. The plant material was processed and herbarium was prepared as per the standard guidelines. Voucher specimen is maintained in the Department of Biochemistry and Pathology, National Ayurveda Research Institute for Panchakarma (NARIP), Cheruthuruthy for ready reference.

Extraction [6]

The air-dried, powdered plant leaf material was extracted by various methods using different solvents. The hot solvent extraction was extraction for 8 hourswas done by Soxhlet method using ethanol. Methanolic extract was prepared by cold extraction method. The plant material was soaked in methanol for overnight 10-12 hours and filtered through Whatman filter paper No. 1. The aqueous extract was prepared as per the protocol prescribed in Ayurvedic pharmacopeia of India. The solvent was removed under reduced pressure at suitable temperature using rotovac equipment. The solvent free extract was aliquoted and stored in refrigerated condition for ready to use form.

Physicochemical Characteristics [7,8]

Physico-chemical analysis such as moisture content, total ash, water soluble ash, acid insoluble ash, water soluble extractive and alcohol soluble extractive were carried out as per the standard protocols developed and standardized at NARIP was used.

Phytochemical analysis [9,10]

The phytochemical analysis was carried out as per the standard protocols that has been standardised in NARIP. It comprised of various tests including Froth's test, Libermann Burchard test, Fehling's test, Salkowski test, Dragendorff's test, Keller Killani test and Ellagic acid test.

Spectrophotometric Analysis [11,12]

Spectrophotometric characteristics were analysed for understanding the basic chemical profiling of study plant and to compare the proposition of major compounds among different solvent extracts. The ethanolic extract, methanolic extract and aqueous extract of *P. foetida* leaf at different concentrations were used for spectroscopic analysis using the concerned solvent as blank. The spectrum characteristics were measured after standardizing the procedures and analysis was confirmed by carrying out triplicate analysis at 200-800 nm.

Chemicals and Reagents

The chemicals and reagents of AR grade purchased from make of Spectrum, Nice and HiMedia were used for the present study.

Instruments

UV Spectrophotometer of Agilent-Cary 60was used for spectroscopic analysis.

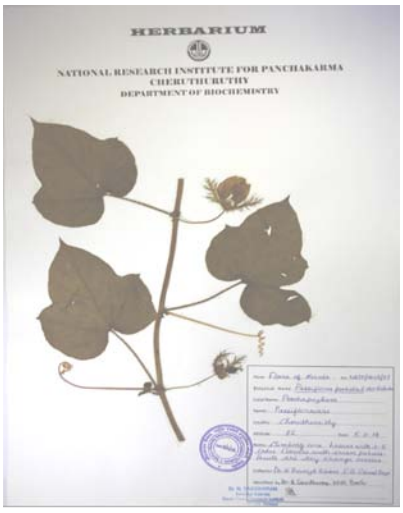

Fig.1 : Herbarium of Passiflora foetida

RESULTS AND DISCUSSION

The authentication of the plant *Passiflora foetida*L. has been presented in the Figure 1. The Proximate composition analysis has documented the details of extractive yield, total ash content and fractions of various ash types, soluble extractive percentage and documented in Table 1. The extractive yield is found to be 33.26% and the total ash content was 9.25%. The phytochemical analysis showed the highly presence of tannins, saponins and flavonoids in ethanol, methanol and aqueous extracts. Alkaloids was highly present in ethanolic extract when compared with methanol and aqueous extracts (Table 2). Spectrophotometric analysis showed various prominent peaks in the spectrum of 200-800 nm representing the presence of compounds like alkaloids, steroids and flavonoids. The spectroscopy study documented the data of ethanolic extract, methanolic extract and aqueous extract at different concentration levels and the study was confirmed by triplicate analysis (Figure 2-4 and Table 3-5).

Table1.Physico chemical Characteristics of *Passiflora foeitida* L.

S No	Proximate Compounds	*Passiflora foetida* L. (Shade Dried Leaf)
1	Extractive Yield (%)	33.26 %
2	Moisture content (%)	4.292 %
3	Total Ash (%)	9.25 %
4	Water Soluble Ash (%)	2.74 %
5	Acid Insoluble Ash (%)	1.732 %
6	Water Soluble Extractive (%)	21.78 %
7	Alcohol Soluble Extractive (%)	10.30 %

Table 2. Phytochemical Characteristics of *P. foetida* Leaf Extracts

S.No	Phytochemical Compounds	Method	*Passiflora foetida*: Shade Dried Leaf		
			Ethanolic Extract	Methanolic Extract	Aqueous Extract
1	Tannins	Ferric Chloride Test	++	++	+
2	Saponins	Froth's Test	++	++	+
3	Terpenoids	Salkowsky's Test	+	++	+
4	Cardiac Glycosides	Keller-Killani Test	-	+	+
5	Flavonoids	Shinoda Test	+++	+++	+++
		Lead acetate Test	+	+	++
		Alkaline Reagent Test	+	+	+
6	Carbohydrates	Fehling 's Test	+	++	+++
		Molisch Test	++	++	++
		Benedict's Test	++	+	++
7	Phytosterols	Liebermann Burchad Test	+	+	+
8	Proteins	Biuret test	-	-	-
		Xantha protein test	+	-	+

9	Alkaloids	Dragendorff's Test	+++	++	+
		Mayer's Test	++	+	++
		Hager's Test	+++	++	+
		Wagner's Test	++	++	-
10	Anthraquinones	Test with 10% KOH	-	-	-

+++ Highly Present ++ Medium + Trace - Not present

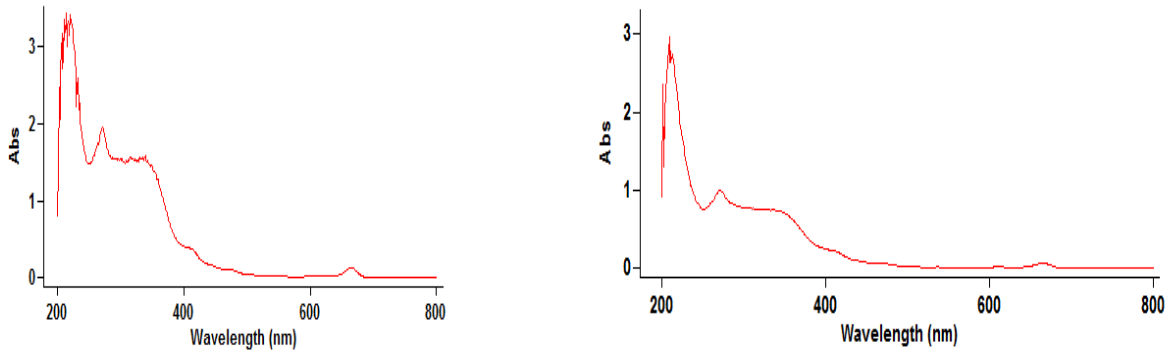

Fig. 2. UV Spectroscopic analysis of Methanolic extract of P. Foetida Leaf at different concentration

Table 3. Comparative Data of Spectroscopic Analysis of Methanolic Extract of *P. foetida* Leaf at Different Concentrations

Sample Name: *P. foetida Leaf -Methanolic extract* Concentration- **0.125%** 200-800 nm		Sample Name: *P. foetida Methanolic extract* Concentration- **0.0625%** 200-800 nm	
Wavelength	**Absorbance**	**Wavelength**	**Absorbance**
665.0	0.136	666.0	0.068
263.0	1.747	272.0	0.994
231.0	2.525		
222.0	3.324		
220.0	3.392		

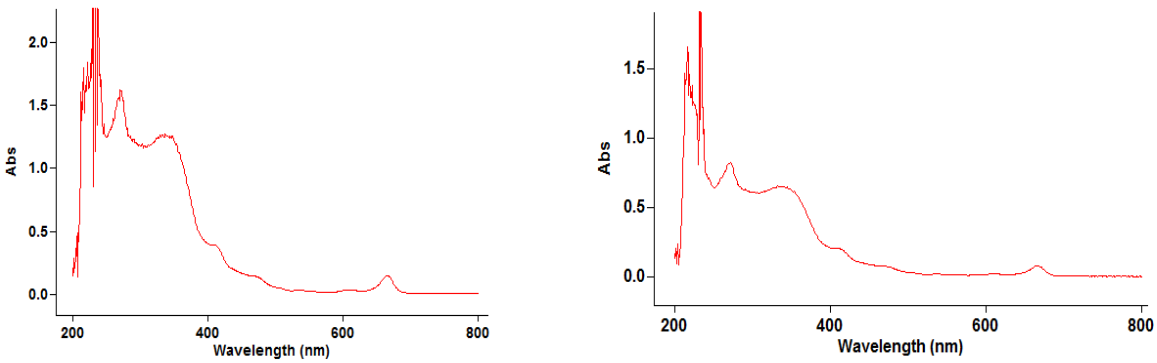

Fig.3. UV Spectroscopic analysis of Ethanolic extract of P. Foetida Leaf at different concentration

Table4. Comparative data of Spectroscopic analysis of Ethanolic extract of *P. Foetida* Leaf at different concentrations.

Sample Name: *P. foetida*Leaf E*thanolic extract* Concentration -**0.125%** 200-800 nm		Sample Name: *P. foetida*Leaf E*thanolic extract* Concentration -**0.0625%** 200-800 nm	
Wavelength	**Absorbance**	**Wavelength**	**Absorbance**
666.0	0.150	666.0	0.076
260.0	1.395	224.0	1.259
227.0	1.949	222.0	1.374
224.0	1.710	219.0	1.459
222.0	1.842		
219.0	1.659		

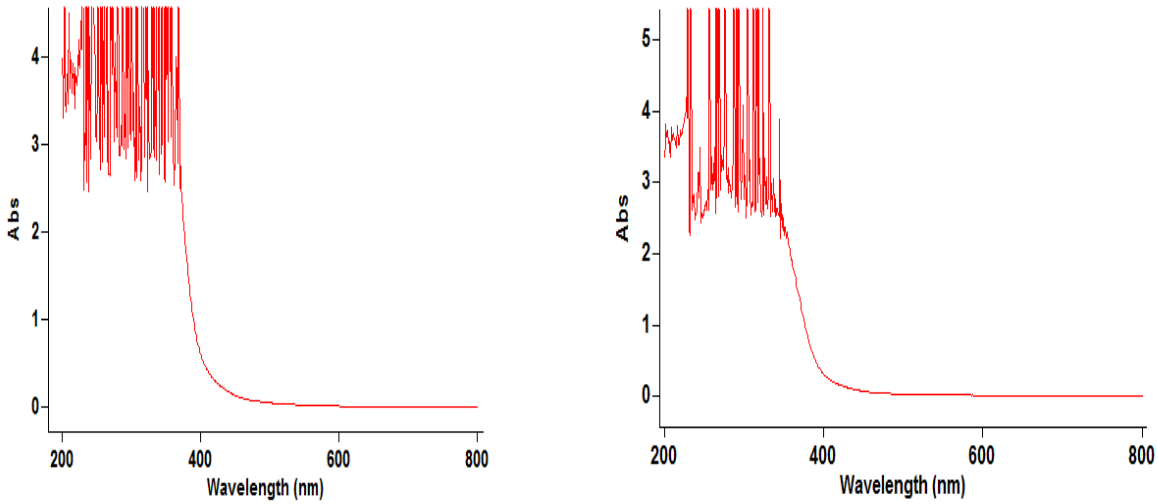

Fig.4. UV Spectroscopic analysis of Aqueous extract of P. foetidaLeaf at different Concentration

Table 5. Comparative data of Spectroscopic analysis of Aqueous extract of *P. Foetida* Leaf at different concentrations.

Sample Name: *P. foetida*Leaf Aqueous Extract Concentration-**1/20** 200-800 nm		Sample Name: *P. foetida*Leaf Aqueous Extract Concentration -**1/40** 200-800 nm	
Wavelength	**Absorbance**	**Wavelength**	**Absorbance**
292.0	3.455	342.0	2.634
286.0	3.319	260.0	3.363
224.0	4.179	228.0	4.191

CONCLUSION

The study documented the physico-chemical characteristic, phytochemical constituents and spectroscopic characteristics of *Passiflora foetida* L. The study evidenced the presence of various active phytoconstituents such as tannins, saponins, flavonoids, alkaloids in

the ethanol, methanol and aqueous extracts of leaf at various proposition. This study gives anoverall view on chemical profiling of *P. Foetida* for understanding its medicinal importance. The further studies are highly required focussing on isolation and characterization of individual compounds in these extractsand evaluating their biopotency for its use in clinical practice extensively.

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Conflict of Interest: Nil

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